GENERAL / SPECIFICATIONS

FLETCHER FLOOD RECOVERY SUPPORT
ELECTRICAL EQUIPMENT REPLACEMENT

FLETCHER PARK

FLETCHER, NORTH CAROLINA

Digitally signed by
Phillip A. Fisher
Date: 2025.02.25
15:20:10-05'00'

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FEBRUARY 2025

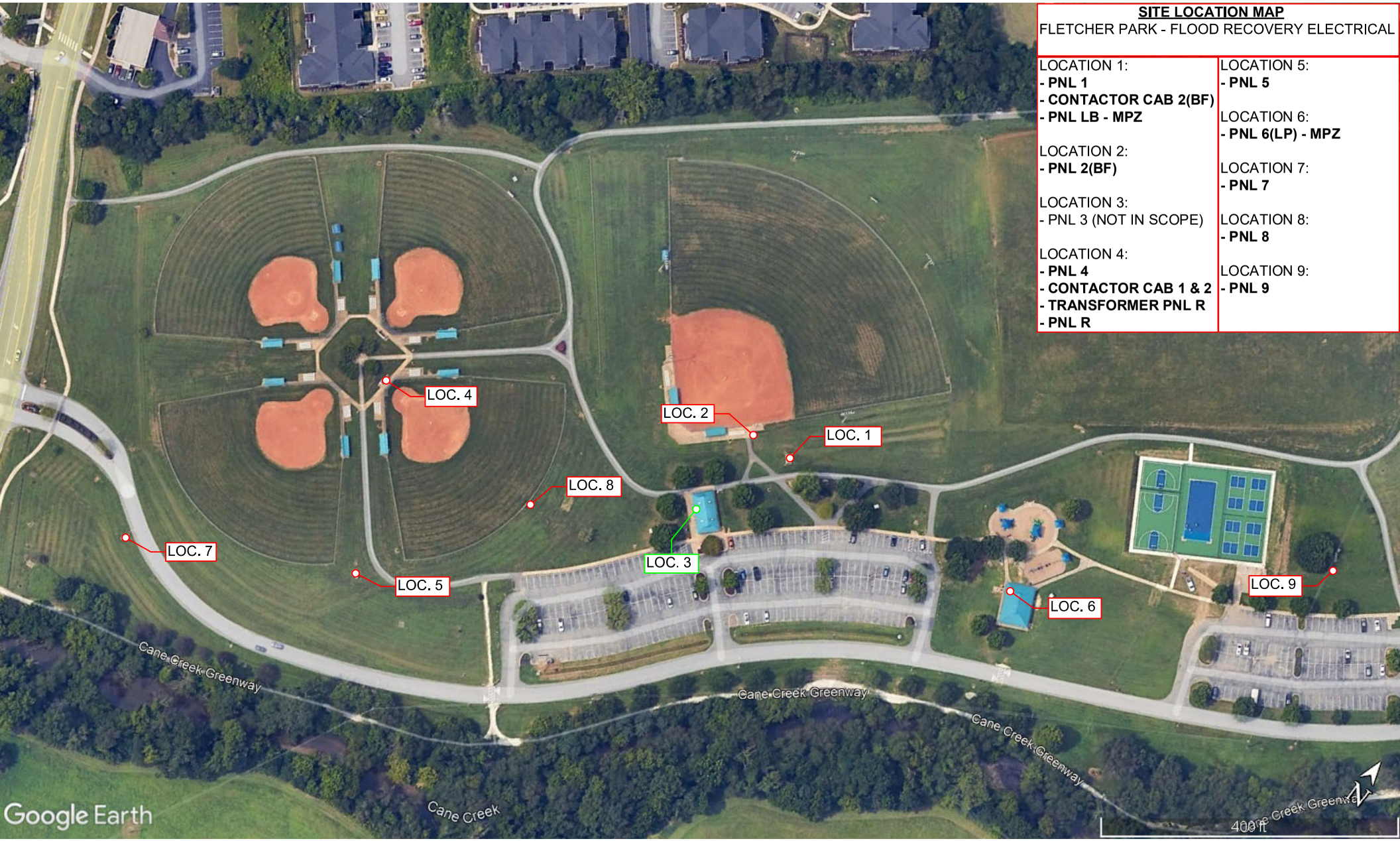
PROJECT NO. # 24.00148

General / Specifications Table of Contents

Fletcher NC – Flood Recovery Support_Electrical

The information provide in this document is based on existing conditions. Photos are for reference purposes only and contractor should visit the site prior to bidding on this work. See site location map for relative locations for equipment shown below. Any questions or discrepancies found should be brought to the attention of the Town of Fletcher immediately during the bidding process.

- Follow all applicable codes associated with this work.
- The Contractor shall provide all labor and materials associated with this work.
- Panel schedules and circuits should be verified and labeled accordingly.
- All equipment provided shall comply with the applicable attached specifications.
- Provide equipment with dimensions suitable for installation in the available space.
- Equipment electrical ratings contained herein match the ratings of the existing flood damaged equipment. No new load is being added to this equipment and therefore no load calculations were performed.
- The electrical distribution system configuration is not changing; therefore, no equipment duty calculations were performed.



SITE LOCATION MAP

FLETCHER PARK - FLOOD RECOVERY ELECTRICAL

LOCATION 1: **- PNL 1** **- CONTACTOR CAB 2(BF)** **- PNL LB - MPZ** LOCATION 2: **- PNL 2(BF)** LOCATION 3: - PNL 3 (NOT IN SCOPE) LOCATION 4: **- PNL 4** **- CONTACTOR CAB 1 & 2** **- TRANSFORMER PNL R** **- PNL R**	LOCATION 5: **- PNL 5** LOCATION 6: **- PNL 6(LP) - MPZ** LOCATION 7: **- PNL 7** LOCATION 8: **- PNL 8** LOCATION 9: **- PNL 9**

PANEL 1 – LOCATION 1

DESCRIPTION: Provide and replace panel and breakers. Re-work all feeders and conduits associated with this panel.

PANEL 1

CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT
1	0	PANEL LB	–	–	–	20	1
3	0					3P	3
5	0						5
7	0	PANEL LP	–	–	–	20	7
9	0					3P	9
11	0						11
13	0	PANEL BF	–	–	–	175	13
15	0					3P	15
17	0						17

CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
2	–	–	–	–	SPACE ONLY	0	2
4	–	–	–	–		0	4
6	–	–	–	–		0	6
8	–	–	–	–	SPACE ONLY	0	8
10	–	–	–	–		0	10
12	–	–	–	–		0	12
14	–	–	–	–	SPACE ONLY	0	14
16	–	–	–	–		0	16
18	–	–	–	–		0	18

277 / 480 V
3 PHASE
4 WIRE

225 A MINIMUM BUS SIZE
MAIN LUGS ONLY
14,000 MINIMUM AIC RATING

SURFACE MOUNTING
NEMA 3R ENCLOSURE
GROUND BAR
UL SE LABEL

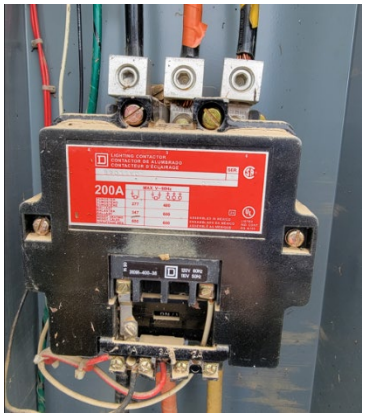
NOTES:
1. EXISTING PANEL TYPE IS A SQUARE D I-LINE HCM
2. FED FROM METER #: 322 851 027
3. REPLACE PANEL WITH LIKE KIND CONFIGURATION
4.
5.

CONNECTED LOADS	
PH. A:	0.0 KVA
PH. B:	0.0 KVA
PH. C:	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A

CONTACTOR CABINET 1 for PNL 2(BF) – LOCATION 1

DESCRIPTION: Provide and replace cabinet and contactor. Re-work all feeders and conduits associated with this cabinet.

- Provide key-operated control switch to match existing.



PANEL LB – MPZ – LOCATION 1

DESCRIPTION: Provide and replace MPZ and breakers. Re-work all feeders and conduits associated with this panel.

PANEL LB

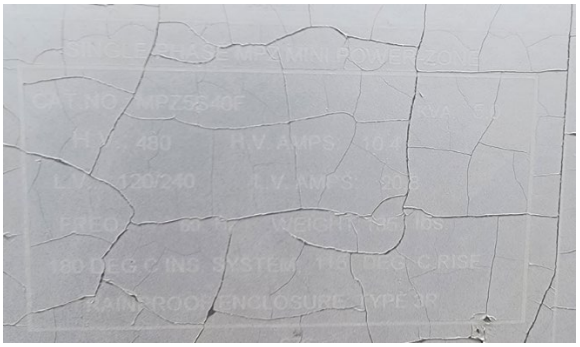
CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0	MISC.	–	–	–	20	1	2	30	–	–	–	SECONDARY MAIN	0	2
3	0	MISC.	–	–	–	20	3	4	2P	–	–	–		0	4
5	0	SPACE ONLY	–	–	–	–	5	6	20	–	–	–	GFCI	0	6
7	0	SPACE ONLY	–	–	–	–	7	8	–	–	–	–	SPACE ONLY	0	8
9	0	SPACE ONLY	–	–	–	–	9	10	–	–	–	–	SPACE ONLY	0	10
11	0	SPACE ONLY	–	–	–	–	11	12	–	–	–	–	SPACE ONLY	0	12

120 / 240 V	30 A	MINIMUM BUS SIZE	SURFA(MOUNTING
2 PHASE	30 A	MAIN CIRCUIT BREAKER	NEMA 3R ENCLOSURE
3 WIRE	10000	MINIMUM AIC RATING	GROUND BAR

NOTES:

1. EXISTING PANEL TYPE IS SQUARE D MPZ -5KVA XFMR 480V - 120/240V, 20A PRIMARY MAIN CB
2. FED FROM PANEL 01
3. REPLACE PANEL WITH LIKE KIND CONFIGURATION
4.
5.

CONNECTED LOADS	
PH. A:	0.0 KVA
PH. B:	0.0 KVA
PH. C:	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A



PANEL 2 (BF) – LOCATION 2

DESCRIPTION: Provide and replace panel and breakers. Re-work all feeders and conduits associated with this panel.

PANEL 2

CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0	POLE LIGHTS	–	–	–	30	1	2	30	–	–	–	POLE LIGHTS	0	2
3	0					3P	3	4	3P					0	4
5	0						5	6						0	6
7	0	POLE LIGHTS	–	–	–	40	7	8	40	–	–	–	POLE LIGHTS	0	8
9	0					3P	9	10	3P					0	10
11	0						11	12						0	12
13	0	POLE LIGHTS	–	–	–	30	13	14	30	–	–	–	POLE LIGHTS	0	14
15	0					3P	15	16	3P					0	16
17	0						17	18						0	18

277 / 480 V	225 A	MINIMUM BUS SIZE	SURFACE MOUNTING
3 PHASE		MAIN LUGS ONLY	NEMA 3R ENCLOSURE
3 WIRE	14,000	MINIMUM AIC RATING	GROUND BAR

NOTES:

1. EXISTING PANEL TYPE IS A SQUARE D I-LINE HCN
2. FED FROM PANEL 01 VIA CONTACTOR PANEL BESIDE PANEL 01
3. REPLACE PANEL WITH LIKE KIND CONFIGURATION
4.
5.

CONNECTED LOADS	
PH. A:	0.0 KVA
PH. B:	0.0 KVA
PH. C:	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A

PANEL 3 – LOCATION 3 (NOT IN SCOPE)

DESCRIPTION: Evaluated and replaced/repaired by Owner. No work associated with this panel.

PANEL 4 – LOCATION 4

DESCRIPTION: Provide and replace panel and breakers. Re-work all feeders and conduits associated with this panel.

PANEL 4

CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT
1	0	PANEL R	–	–	–	30	1
3	0					3P	3
5	0						5
7	0	LL FIELD #2	–	–	–	70	7
9	0					3P	9
11	0						11
13	0	SPACE ONLY (FUT LL FIELD)	–	–	–	–	13
15	0	SPACE ONLY	–	–	–	–	15
17	0	SPACE ONLY	–	–	–	–	17

CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
2	70	–	–	–	LL FIELD #1	0	2
4	3P					0	4
6						0	6
8	–	–	–	–	SPACE ONLY (FUT LL FIELD)	0	8
10	–	–	–	–		0	10
12	–	–	–	–		0	12
14	–	–	–	–	SPACE ONLY	0	14
16	–	–	–	–	SPACE ONLY	0	16
18	–	–	–	–	SPACE ONLY	0	18

277 / 480 V
3 PHASE
4 WIRE

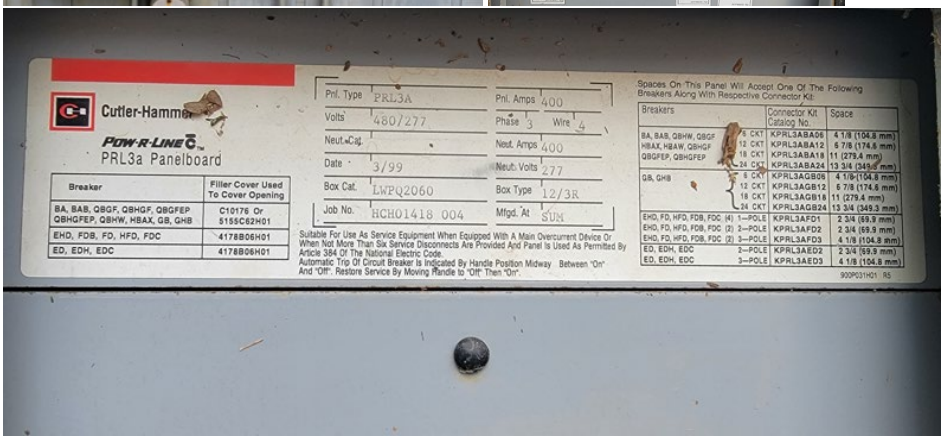
400 A MINIMUM BUS SIZE
MAIN LUGS ONLY
14,000 MINIMUM AIC RATING

SURFACE MOUNTING
NEMA 3R ENCLOSURE
GROUND BAR
UL SE LABEL

NOTES:

1. EXISTING PANEL TYPE IS A CUTLER HAMMER PRL3A
2. FED FROM ??
3. REPLACE PANEL WITH LIKE KIND CONFIGURATION
4.
5.

CONNECTED LOADS	
PH. A:	0.0 KVA
PH. B:	0.0 KVA
PH. C:	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A



CONTACTOR CABINET 1 & 2 – LOCATION 4

DESCRIPTION: Provide and replace cabinet and contactor. Re-work all feeders and conduits associated with this cabinet.

- Provide key-operated control switch to match existing.
- Provide integral control power transformer.


Transformer for Panel R – LOCATION 4

DESCRIPTION: Provide and replace transformer. Re-work all feeders and conduits associated with this transformer.

- Existing Transformer Information:
  - Cutler-Hammer Model #:Y48D28T15N, Enclosure Type 3R,15KVA, 480V – 208Y/120V


PANEL R – LOCATION 4

DESCRIPTION: Provide and replace panel and breakers. Re-work all feeders and conduits associated with this panel.

PANEL R

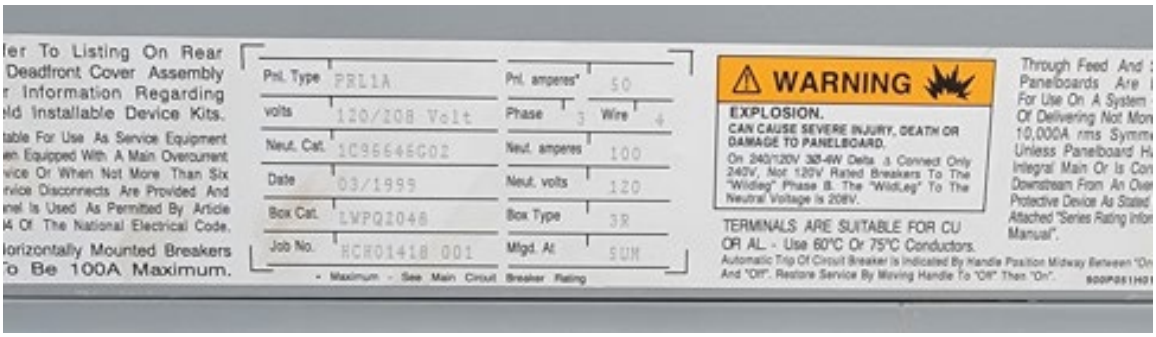
CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0	LIGHT	–	–	–	20	1	2	20	–	–	–	SCOREBOARD	0	2
3	0	MISC.	–	–	–	20	3	4	20	–	–	–	SCOREBOARD	0	4
5	0	MISC.	–	–	–	20	5	6	20	–	–	–	SCOREBOARD	0	6
7	0	SPRINKLER	–	–	–	20	7	8	40	–	–	–	SCOREBOARD - PNL 08	0	8
9	0	FLAG LIGHT	–	–	–	20	9	10	2P					0	10
11	0	MISC.	–	–	–	20	11	12	20	–	–	–	MISC.	0	12
13	0	MISC.	–	–	–	20	13	14	20	–	–	–	MISC.	0	14
15	0	MISC.	–	–	–	20	15	16	20	–	–	–	MISC.	0	16
17	0	MISC.	–	–	–	20	17	18	20	–	–	–	MISC.	0	18
19	0	SPACE ONLY	–	–	–	–	19	20	–	–	–	–	SPACE ONLY	0	20
21	0	SPACE ONLY	–	–	–	–	21	22	–	–	–	–	SPACE ONLY	0	22
23	0	SPACE ONLY	–	–	–	–	23	24	–	–	–	–	SPACE ONLY	0	24
25	0	MAIN BREAKER	–	–	–	50	25	26	–	–	–	–	SPACE ONLY	0	26
27	0					3P	27	28	–	–	–	–	SPACE ONLY	0	28
29	0						29	30	–	–	–	–	SPACE ONLY	0	30

120 / 208 V	50 A	MINIMUM BUS SIZE	SURFACE MOUNTING
3 PHASE	50 A	MAIN CIRCUIT BREAKER	NEMA 3R ENCLOSURE
4 WIRE	10,000	MINIMUM AIC RATING	GROUND BAR

NOTES:

1. EXISTING PANEL TYPE IS A SQUARE D I-LINE HCN
2. FED FROM PANEL 04 VIA 15KVA XFMR LOCATED BESIDE PANEL R
3. REPLACE PANEL WITH LIKE KIND CONFIGURATION
4.
5.

CONNECTED LOADS	
PH. A:	0.0 KVA
PH. B:	0.0 KVA
PH. C:	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A



PANEL 5 – LOCATION 5

DESCRIPTION: Provide and replace combo meter panel and breakers. Re-work all feeders and conduits associated with this panel. Coordinate with Duke Energy during installation to verify feeder is de-energized and meter is available.

PANEL 5

CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0	-	–	–	–	–	1	2	–	–	–	–	SPACE ONLY	0	2
3	0	-	–	–	–	–	3	4	–	–	–	–	SPACE ONLY	0	4
5	0	-	–	–	–	–	5	6	–	–	–	–	SPACE ONLY	0	6
7	0	-	–	–	–	–	7	8	–	–	–	–	SPACE ONLY	0	8
9	0	-	–	–	–	–	9	10	200	–	–	–	MAIN BREAKER	0	10
11	0	-	–	–	–	–	11	12	2P					0	12
13	0	-	–	–	–	–	13	14	4 POS					0	14
15	0	-	–	–	–	–	15	16						0	16
17	0	-	–	–	–	–	17	18	–	–	–	–	SPACE ONLY	0	18
19	0	-	–	–	–	–	19	20	–	–	–	–	SPACE ONLY	0	20
21	0	-	–	–	–	–	21	22	80	–	–	–	MISC.	0	22
23	0	-	–	–	–	–	23	24	2P	–	–	–		0	24

120 / 240 V	200	A MINIMUM BUS SIZE	SURFACE MOUNTING
1 PHASE	200	A MAIN CIRCUIT BREAKER	NEMA 3R ENCLOSURE
3 WIRE	10,000	MINIMUM AIC RATING	GROUND BAR
			UL SE LABEL

NOTES:
1. EXISTING PANEL TYPE IS COMBO METER
2. FED FROM 25KVA XFMR #: 135D02
3. REPLACE PANEL WITH LIKE KIND CONFIGURATION
4.
5.

CONNECTED LOADS	
LN 1	0.0 KVA
LN 2	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A

PANEL 6 (LP) – MPZ – LOCATION 6

DESCRIPTION: Provide and replace MPZ and breakers. Re-work all feeders and conduits associated with this panel.

PANEL 6

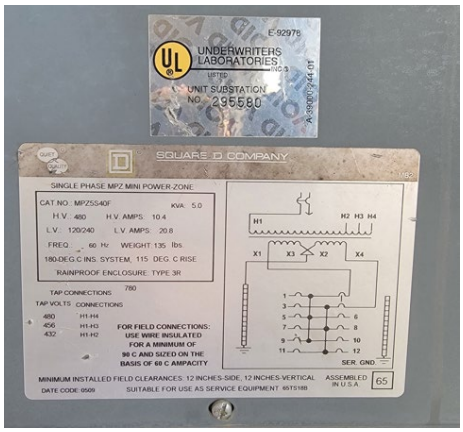
CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0	LIGHTS	–	–	–	20	1	2	30	–	–	–	SECONDARY MAIN	0	2
3	0	FUTURE FANS	–	–	–	20	3	4	2P					0	4
5	0	LIGHTING CONTROLS	–	–	–	20	5	6	20	–	–	–	RECEPTACLES - GFCI	0	6
7	0	SPARE	–	–	–	20	7	8	20	–	–	–	RECEPTACLES - GFCI	0	8
9	0	SPACE ONLY	–	–	–	–	9	10	–	–	–	–	SPACE ONLY	0	10
11	0	SPACE ONLY	–	–	–	–	11	12	–	–	–	–	SPACE ONLY	0	12

120 / 240 V	30 A	MINIMUM BUS SIZE	SURFACE MOUNTING
1 PHASE	30 A	MAIN CIRCUIT BREAKER	NEMA 3R ENCLOSURE
3 WIRE	10,000	MINIMUM AIC RATING	GROUND BAR

NOTES:

1. LABELED 6 - LB
2. EXISTING PANEL TYPE IS SQUARE D MPZ -5KVA XFMR 480V - 120/240V, 20A PRIMARY MAIN CB
3. FED FROM PANEL 01
4. REPLACE PANEL WITH LIKE KIND CONFIGURATION
5.

CONNECTED LOADS	
LN 1	0.0 KVA
LN 2	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A



PANEL 7 – LOCATION 7

DESCRIPTION: Provide and replace combo meter panel and breakers. Re-work all feeders and conduits associated with this panel. Coordinate with Duke Energy during installation to verify feeder is de-energized and meter is available.

PANEL 7

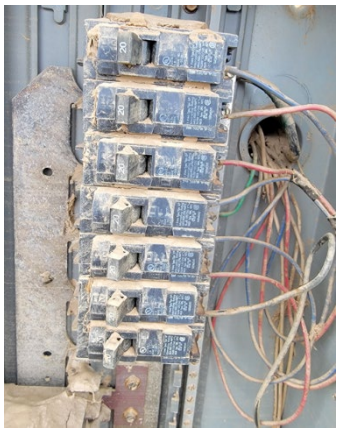
CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0	SPACE ONLY	–	–	–	–	1	2	20	–	–	–	MISC.	0	2
3	0	SPACE ONLY	–	–	–	–	3	4	20	–	–	–	MISC.	0	4
5	0	SPACE ONLY	–	–	–	–	5	6	20	–	–	–	MISC.	0	6
7	0	SPACE ONLY	–	–	–	–	7	8	20	–	–	–	MISC.	0	8
9	0	SPACE ONLY	–	–	–	–	9	10	20	–	–	–	MISC.	0	10
11	0	SPACE ONLY	–	–	–	–	11	12	20	–	–	–	MISC.	0	12
13	0	SPACE ONLY	–	–	–	–	13	14	20	–	–	–	MISC.	0	14
15	0	SPACE ONLY	–	–	–	–	15	16	–	–	–	–	SPACE ONLY	0	16
17	0	SPACE ONLY	–	–	–	–	17	18	–	–	–	–	SPACE ONLY	0	18
19	0	SPACE ONLY	–	–	–	–	19	20	–	–	–	–	SPACE ONLY	0	20
21	0	MAIN BREAKER	–	–	–	200	21	22	–	–	–	–	BLANK	0	22
23	0					2P	23	24	–	–	–	–	BLANK	0	24
25	0					4POS	25	26	–	–	–	–	BLANK	0	26
27	0						27	28	–	–	–	–	BLANK	0	28
29	0	SPACE ONLY	–	–	–	–	29	30	–	–	–	–	SPACE ONLY	0	30
31	0	SPACE ONLY	–	–	–	–	31	32	–	–	–	–	SPACE ONLY	0	32
33	0	SPACE ONLY	–	–	–	–	33	34	–	–	–	–	SPACE ONLY	0	34
35	0	SPACE ONLY	–	–	–	–	35	36	–	–	–	–	SPACE ONLY	0	36
37	0	SPACE ONLY	–	–	–	–	37	38	–	–	–	–	SPACE ONLY	0	38
39	0	SPACE ONLY	–	–	–	–	39	40	–	–	–	–	SPACE ONLY	0	40
41	0	SPACE ONLY	–	–	–	–	41	42	–	–	–	–	SPACE ONLY	0	42

120 / 240 V	200 A MINIMUM BUS SIZE	SURFACE MOUNTING
1 PHASE	200 A MAIN CIRCUIT BREAKER	NEMA 3R ENCLOSURE
3 WIRE	10,000 MINIMUM AIC RATING	GROUND BAR
		UL SE LABEL

NOTES:

1. EXISTING PANEL TYPE IS COMBO METER
2. FED FROM DUKE METER #: 354 632 803
3. REPLACE PANEL WITH LIKE KIND CONFIGURATION
4.
5.

CONNECTED LOADS	
LN 1	0.0 KVA
LN 2	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A



PANEL 8 – LOCATION 8

DESCRIPTION: Provide and replace panel and breakers. Re-work all feeders and conduits associated with this panel.

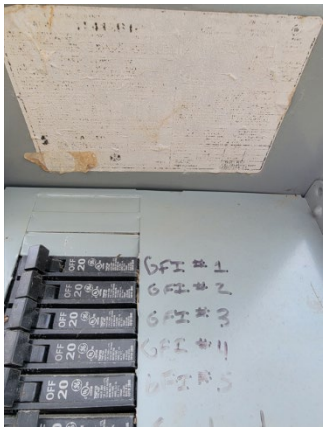
PANEL 8

CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0	SPACE ONLY	–	–	–	–	1	2	–	–	–	–	-	0	2
3	0	SPACE ONLY	–	–	–	–	3	4	–	–	–	–	-	0	4
5	0	SPACE ONLY	–	–	–	–	5	6	–	–	–	–	-	0	6
7	0	GFI #1	–	–	–	20	7	8	–	–	–	–	-	0	8
9	0	GFI #2	–	–	–	20	9	10	–	–	–	–	-	0	10
11	0	GFI #3	–	–	–	20	11	12	–	–	–	–	-	0	12
13	0	GFI #4	–	–	–	20	13	14	–	–	–	–	-	0	14
15	0	GFI #5	–	–	–	20	15	16	–	–	–	–	-	0	16
17	0	SCOREBOARD	–	–	–	20	17	18	–	–	–	–	-	0	18

120 / 208 V	60	A MINIMUM BUS SIZE	SURFACE MOUNTING
1 PHASE		MAIN LUGS ONLY	NEMA 3R ENCLOSURE
3 WIRE	10,000	MINIMUM AIC RATING	GROUND BAR

NOTES:
1. EXISTING PANEL TYPE LOADCENTER
2. FED FROM PANEL R
3. REPLACE PANEL WITH LIKE KIND CONFIGURATION
4.
5.

CONNECTED LOADS	
LN 1	0.0 KVA
LN 2	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A



PANEL 9 – LOCATION 9

DESCRIPTION: Provide and replace combo meter panel and breakers. Re-work all feeders and conduits associated with this panel. Coordinate with Duke Energy during installation to verify feeder is de-energized and meter is available.

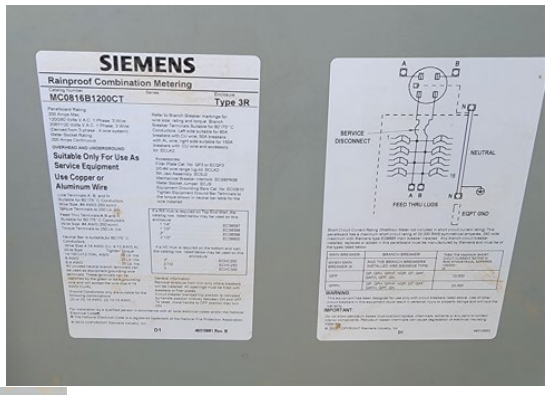
PANEL 9

CCT	LOAD	DESCRIPTION	C	G	W	CB	CCT	CCT	CB	W	G	C	DESCRIPTION	LOAD	CCT
1	0	SPACE ONLY	–	–	–	20	1	2	–	–	–	–	BLANK	0	2
3	0	GFI #1	–	–	–	20	3	4	20	–	–	–	GFI #3	0	4
5	0	GFI #2	–	–	–	20	5	6	20	–	–	–	GFI #4	0	6
7	0	GFI #5	–	–	–	20	7	8	20	–	–	–	CAMERAS	0	8
9	0	GFI #6	–	–	–	20	9	10	20	–	–	–	SPACE ONLY	0	10

120 / 240 V	200 A MINIMUM BUS SIZE	SURFACE MOUNTING
1 PHASE	200 A MAIN CIRCUIT BREAKER	NEMA 3R ENCLOSURE
3 WIRE	10,000 MINIMUM AIC RATING	GROUND BAR
		UL SE LABEL

NOTES:
1. EXISTING PANEL TYPE IS COMBO METER
2. FED FROM DUKE METER #: 325 587 276 VIA 10KVA POLE MOUNTED XFMR
3. REPLACE PANEL WITH LIKE KIND CONFIGURATION
4.
5.

CONNECTED LOADS	
LN 1	0.0 KVA
LN 2	0.0 KVA
TOTAL:	0.0 KVA
DEMAND	0.0 A



SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Lighting contactors.
2. Conductors and cables.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Lighting contactors.
2. Conductors and cables.

B. Shop Drawings:

1. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's warranties.

1.4 WARRANTY

A. Special Extended Warranty: Manufacturer and Installer warrant that installed lighting control devices perform in accordance with specified requirements and agree to repair or replace, including labor, materials, and equipment, devices that fail to perform as specified within extended warranty period.

1. Extended Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LIGHTING CONTACTORS

A. Description: Electrically operated and mechanically held, non-combination-type lighting contactors, complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less THD of normal load current).
2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
3. Enclosure: Comply with NEMA 250.
4. Provide with control and pilot devices as indicated , matching the NEMA type specified for the enclosure.

2.2 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG.

B. Class 1 Control Wire: THWN, stranded-copper conductors not smaller than No. 14 AWG.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install according to manufacturer’s written instructions.

END OF SECTION 260923

SECTION 262213 - LOW-VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Distribution, dry-type transformers with nominal primary and secondary rating of 600 V and less, with capacities up to 1500 kVA.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type and size of transformer.
b. Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer.

B. Shop Drawings:

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of field connections.
2. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturers' Published Instructions: Record copy of official installation instructions issued to Installer by manufacturer for the following:

1. Transformer temporary heating, working clearances, anchoring, torque values, and insulation-resistance testing.

B. Source quality-control reports.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inspection: On receipt, inspect for and note shipping damage to packaging and transformer.

1. If manufacturer packaging is removed for inspection, and transformer will be stored after inspection, re-package transformer using original or new packaging materials that provide protection equivalent to manufacturer's packaging.

B. Storage: Store in warm, dry, and temperature-stable location in original shipping packaging.

C. Handling: Follow manufacturer's instructions for lifting and transporting transformers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of transformer from single source from single manufacturer.

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60 Hz service.

B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

C. Transformers Rated 15 kVA and Larger:

1. Comply with 10 CFR 431 (DOE 2016) efficiency levels.
2. Marked as compliant with DOE 2016 efficiency levels by qualified electrical testing laboratory recognized by authorities having jurisdiction.

D. Shipping Restraints: Paint or otherwise color-code bolts, wedges, blocks, and other restraints that are to be removed after installation and before energizing. Use fluorescent colors that are easily identifiable inside transformer enclosure.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NFPA 70, and list and label as complying with UL 1561.

B. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.

1. One leg per phase.
2. Core volume must allow efficient transformer operation at 10 percent above nominal tap voltage.
3. Grounded to enclosure.

C. Coils: Continuous windings without splices except for taps.

1. Coil Material: Aluminum or copper.
2. Internal Coil Connections: Brazed or pressure type.

3. Terminal Connections: Bolted.

D. Encapsulation: Transformers smaller than 30 kVA must have core and coils completely resin encapsulated.

E. Enclosure: Totally enclosed, nonventilated.

1. Core and coil must be encapsulated within resin compound using vacuum-pressure impregnation process to seal out moisture and air.
2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.
3. Wiring Compartment: Sized for conduit entry and wiring installation.
4. Environmental Protection:

a. Indoor: UL 50E, Type 2.
b. Outdoor: UL 50E, Type 3R.

5. Finish Color: Gray weather-resistant enamel.

F. Taps for Transformers 3 kVA and Smaller: One 5 percent tap above normal full capacity.

G. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.

H. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.

I. Insulation Class, Smaller Than 30 kVA: 180 deg C, UL-component-recognized insulation system with maximum of 115 deg C rise above 40 deg C ambient temperature.

J. Insulation Class, 30 kVA and Larger: 220 deg C, UL-component-recognized insulation system with maximum of 115 deg C rise above 40 deg C ambient temperature.

K. Grounding: Provide ground-bar kit or ground bar installed on inside of transformer enclosure.

L. Wall Brackets: Manufacturer's standard brackets.

2.4 SOURCE QUALITY CONTROL

A. Factory Tests and Inspections: Test and inspect assembled system, by, or under supervision of, qualified electrical testing laboratory recognized by authorities having jurisdiction, in accordance with IEEE C57.12.01 and IEEE C57.12.91 before delivering to site. Affix label with name and date of manufacturer's certification of system compliance on control units.

1. Resistance measurements of windings at rated voltage connections and at tap connections.
2. Ratio tests at rated voltage connections and at tap connections.
3. Phase relation and polarity tests at rated voltage connections.
4. No load losses, and excitation current and rated voltage at rated voltage connections.
5. Impedance and load losses at rated current and rated frequency at rated voltage connections.
6. Applied and induced tensile tests.

7. Regulation and efficiency at rated load and voltage.
8. Insulation-Resistance Tests:

    a. Line-side to ground.
    b. Load-side to ground.
    c. Line-side to load-side.

9. Temperature tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for transformers.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's published instructions.

C. Verify that ground connections are in place.

D. Environment: Enclosures must be rated for environment in which they are located.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wall-mounted transformers level and plumb with wall brackets fabricated by transformer manufacturer.

1. Coordinate installation of wall-mounted and structure-hanging supports with actual transformer provided.

B. Secure transformer to concrete base in accordance with manufacturer's published instructions.

C. Secure covers to enclosure and tighten bolts to manufacturer-recommended torques to reduce noise generation.

D. Remove shipping bolts, blocking, and wedges.

3.3 CONNECTIONS

A. Ground equipment in accordance NEC requirements.

B. Tighten electrical connectors and terminals in accordance with manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

C. Provide flexible connections at conduit and conductor terminations and supports to eliminate sound and vibration transmission to building structure.

3.4 ADJUSTING

A. Adjust transformer taps to match settings of units being replaced.

3.5 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 262213

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Power panelboards.
2. Lighting and appliance branch-circuit panelboards.
3. Load centers.
4. Load centers with integral transformer.
5. Combo utility meter load centers.
6. Disconnecting and overcurrent protective devices.

1.2 DEFINITIONS

A. GFEP: Ground-fault equipment protection.

B. MCCB: Molded-case circuit breaker.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Power panelboards.
2. Lighting and appliance branch-circuit panelboards.
3. Load centers.
4. Load centers with integral transformer.
5. Combo utility meter load centers.
6. Disconnecting and overcurrent protective devices.
7. Include materials, switching and overcurrent protective devices, accessories, and components indicated.
8. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each item of equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
4. Detail bus configuration, current, and voltage ratings.
5. Short-circuit current rating of panelboards and overcurrent protective devices.
6. Detail features, characteristics, and ratings of individual overcurrent protective devices and auxiliary components.

7. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Include Internet link for electronic access to downloadable PDF of coordination curves.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturers' Published Instructions: Record copy of official installation[**and testing**] instructions issued to Installer by manufacturer for the following:

1. Recommended procedures for installing panelboards.
2. Recommended torque settings for bolted connections on panelboards.
3. Recommended temperature range for energizing panelboards.

B. Warranty documentation.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Spare Parts: Furnish to Owner spare parts, for repairing panelboards, that are packaged with protective covering for storage on-site and identified with labels describing contents. Include the following:

1. Keys: Two spares for each type of panelboard cabinet lock.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and prepare panelboards for installation in accordance with NEMA PB 1.

1.7 WARRANTY

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed panelboards perform in accordance with specified requirements and agrees to repair or replace components or products that fail to perform as specified within extended-warranty period.

1. Extended-Warranty Period: Two years from date of Owner Acceptance; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

A. Product Selection for Restricted Space: Photographs indicate available space for panelboards. Provide equipment that will fit in the available space.

B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing agency recognized by authorities having jurisdiction, and marked for intended location and application.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

E. Enclosures: Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.

    a. Indoor Dry and Clean Locations: UL 50E, Type 1.
    b. Outdoor Locations: UL 50E, Type 3R.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims must cover live parts and may have no exposed hardware.
3. Finishes:

    a. Panels and Trim: Galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
    b. Back Boxes: Same material and finish as panels and trim.

F. Incoming Mains:

1. Location: As required to match existing wiring.

G. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

    a. Plating must run entire length of bus.
    b. Bus must be fully rated for entire length.

2. Interiors must be factory assembled into unit. Replacing switching and protective devices may not disturb adjacent units or require removing main bus connectors.
3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure.

H. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Terminations must allow use of 75 deg C rated conductors without derating.
3. Size: Lugs suitable for existing conductor sizes.
4. Main and Neutral Lugs: Mechanical type, with lug on neutral bar for each pole in panelboard.
5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with lug on bar for each pole in panelboard.

I. Quality-Control Label: Panelboards or load centers must be labeled, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or

load centers must have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.

J. Future Devices: Panelboards or load centers must have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

K. Panelboard Short-Circuit Current Rating:

1. Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for 100 percent interrupting capacity.

a. Panelboards and overcurrent protective devices rated 240 V or less must have short-circuit ratings as shown on Drawings, but not less than 10 000 A(rms) symmetrical.
b. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V must have short-circuit ratings as shown on Drawings, but not less than 14 000 A(rms) symmetrical.

2.2 POWER PANELBOARDS

A. Listing Criteria: NEMA PB 1, distribution type.

B. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inch (914 mm) high, provide two latches, keyed alike.

C. Mains: Circuit breaker or lugs only as indicated.

D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Listing Criteria: NEMA PB 1, lighting and appliance branch-circuit type.

B. Mains: Circuit breaker or lugs only as indicated.

C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

2.4 LOAD CENTERS

A. Listing Criteria: Comply with UL 67.

B. Mains: Circuit breaker or lugs only as indicated.

C. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.

D. Doors: Concealed hinges secured with flush latch with tumbler lock; keyed alike.

E. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:

    a. Inverse time-current element for low-level overloads.
    b. Instantaneous magnetic trip element for short circuits.
    c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6 mA trip).
3. GFEP Circuit Breakers: Class B ground-fault protection (30 mA trip).
4. MCCB Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Breaker handle indicates tripped status.
    c. UL listed for reverse connection without restrictive line or load ratings.
    d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    e. Multipole units enclosed in single housing with single handle or factory assembled to operate as single unit.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.

B. Receive, inspect, handle, and store panelboards in accordance with NEMA PB 1.1.

C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.

D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's published instructions.

B. Reference Standards:

1. Panelboards: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA PB 1.1.

C. Special Techniques:

1. Equipment Mounting:
2. Mount panelboard cabinet plumb and rigid without distortion of box.
3. Install overcurrent protective devices and controllers not already factory installed.
    a. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver in accordance with manufacturer's published instructions.

4. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
5. Install filler plates in unused spaces.
6. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.3 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles must be located on interior of panelboard door.

B. Breaker Labels: Faceplate must list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory:

1. Provide directory card inside panelboard door, mounted in metal frame with transparent protective cover.

    a. Circuit directory must identify specific purpose with detail sufficient to distinguish it from other circuits.

END OF SECTION 262416