

# CHARLOTTE COUNTY UTILITIES

## DESIGN STANDARDS FOR REMOTE STATIONS

### LIFT STATION CONTROL PANEL

### RTU ONLY



LIFT STATION RTU PANEL	
Sheet Number	Sheet Title
E4.0	COVER SHEET AND DRAWING INDEX
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E4.3	BACKPANEL DETAILS AND BILL OF MATERIAL
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SHEET INDEX

REV	DESCRIPTION	DATE
2	REVISED	AUG-2024
1	REVISED	OCT-2023
0	STANDARDS	MAR-2023

REVISIONS

CHARLOTTE COUNTY UTILITIES DEPARTMENT

NOTE: PROVIDED FOR INFORMATIONAL PURPOSES ONLY. NO MODIFICATIONS WITHOUT WRITTEN CCU APPROVAL. FOR EACH INSTALLATION A SPECIFIC SET OF CONSTRUCTION DRAWINGS AND SPECIFICATIONS (IF DEEMED NECESSARY BY THE DESIGN ENGINEER) MUST BE PREPARED.



CHARLOTTE COUNTY UTILITIES - REMOTE SITES CONTROL PANEL STANDARDS

LIFT STATION RTU PANEL  
COVER SHEET AND DRAWING INDEX

DATE: OCTOBER 2023
MCE PROJ. # 07169-0012
DRAWN: CJA
DESIGNED: CJA
CHECKED: EEB
PROJ. MGR.: EEB




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HORIZONTAL:	
VERTICAL:	1
	REVISION

STATUS:



# ELECTRICAL SYMBOLS

## ISA-5.3 LOOP SYMBOLS





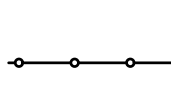
### DISTRIBUTED CONTROL/SHARED DISPLAY SYMBOLS

-  NORMALLY ACCESSIBLE TO OPERATOR
-  AUXILLIARY OPERATOR'S INTERFACE DEVICE
-  NOT NORMALLY ACCESSIBLE TO OPERATOR



















### COMPUTER SYMBOLS

-  NORMALLY ACCESSIBLE TO OPERATOR
-  NOT NORMALLY ACCESSIBLE TO OPERATOR



















### LOGIC AND SEQUENTIAL CONTROL SYMBOLS

-  GENERAL LOGIC
-  DISTRIBUTED INTERCONNECTING CONTROLLER, NOT NORMALLY ACCESSIBLE TO OPERATOR
-  DISTRIBUTED INTERCONNECTING CONTROLLER, NORMALLY ACCESSIBLE TO OPERATOR
-  COMPUTATION/SIGNAL CONDITIONING
-  SYSTEM/SOFTWARE/NETWORK LINK

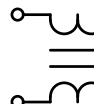

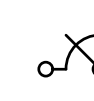
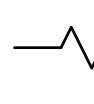
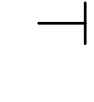




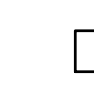
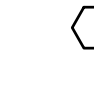
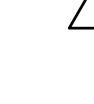


## DEVICE SYMBOLS

-  RELAY COIL
-  CONTACT, N.O.
-  CONTACT, N.C.
-  TIMER RELAY COIL
-  TIME-ON DELAY, N.O. CONTACT
-  TIME-ON DELAY, N.C. CONTACT
-  TIME-OFF DELAY, N.O. CONTACT
-  TIME-OFF DELAY, N.C. CONTACT
-  PUSH BUTTON, N.O. CONTACT
-  PUSH BUTTON, N.C. CONTACT
-  MUSHROOM HEAD PUSH BUTTON, N.O. CONTACT
-  MUSHROOM HEAD PUSH BUTTON, N.C. CONTACT
-  SELECTOR SWITCH, N.O. CONTACT
-  SELECTOR SWITCH, N.C. CONTACT
-  LIMIT SWITCH, N.O. CONTACT
-  LIMIT SWITCH, N.C. CONTACT
-  PRESSURE SWITCH, N.O. CONTACT
-  PRESSURE SWITCH, N.C. CONTACT


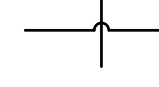

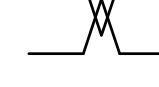
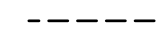
## DEVICE SYMBOLS

-  TEMPERATURE SWITCH, N.O. CONTACT
-  TEMPERATURE SWITCH, N.C. CONTACT
-  FLOW SWITCH, N.O. CONTACT
-  FLOW SWITCH, N.C. CONTACT
-  FLOAT SWITCH, N.O. CONTACT
-  FLOAT SWITCH, N.C. CONTACT
-  FOOT SWITCH, N.O. CONTACT
-  FOOT SWITCH, N.C. CONTACT
-  TOGGLE SWITCH, N.O. CONTACT
-  TOGGLE SWITCH, N.C. CONTACT
-  THERMAL OVERLOAD
-  SOLENOID
-  HORN
-  PILOT LIGHT  
W - WHITE G - GREEN  
A - AMBER R - RED  
B - BLUE
-  PILOT LIGHT, PUSH TO TEST
-  FUSE
-  CIRCUIT BREAKER
-  GROUND

## DEVICE SYMBOLS

-  CONTROL POWER TRANSFORMER
-  CURRENT TRANSFORMER
-  POTENTIOMETER
-  RESISTOR
-  CAPACITOR, ELECTROLYTIC
-  DIODE
-  ZENER DIODE
-  BATTERY
-  TERMINAL BLOCK, "PTB 120VAC"
-  TERMINAL BLOCK, "DIGITAL INPUT"
-  TERMINAL BLOCK, "DRY CONTACT"
-  TERMINAL BLOCK, "ANALOG SIGNAL"
-  TERMINAL BLOCK, OTHER (SPECIFY)
-  ELAPSED TIME METER

## WIRE SYMBOLS

-  CONDUCTORS, WITH JUNCTION
-  CONDUCTORS, NOT CONNECTED
-  SHIELDED CABLE
-  TWISTED-PAIR CABLE
-  FIELD WIRING

## ABBREVIATIONS

- AIT ANALYSIS INDICATING TRANSMITTER
- AFD ADJUST FREQUENCY DRIVE
- BC BYPASS CONTACTOR
- BFI BLOWN FUSE INDICATOR
- C CONTACTOR
- CB CIRCUIT BREAKER
- CPT CONTROL POWER TRANSFORMER
- CR CONTROL RELAY
- CRI CONTROL RELAY, INTRINSIC
- CRL CONTROL RELAY, LATCH
- DFR DRIVE FAIL RELAY
- DI DIGITAL INDICATOR
- DUP DUPLEXOR
- DRR DRIVE RUN RELAY
- DSC DISCONNECT SWITCH
- ETM ELAPSED TIME METER
- FIT FLOW INDICATING TRANSMITTER
- FS FLOAT SWITCH
- FSR FLOAT SWITCH RELAY
- FU FUSE
- GRD GROUND
- HS HAND SWITCH
- IC ISOLATION CONTACTOR
- ISO SIGNAL ISOLATOR/BOOSTER
- LT PILOT LIGHT
- LIT LEVEL INDICATING TRANSMITTER
- LS LIMIT SWITCH
- M MOTOR STARTER
- MCC MOTOR CONTROL CENTER
- MCP MOTOR CIRCUIT PROTECTOR
- MSP MAIN SURGE PROTECTOR
- OL OVERLOAD
- PB PUSH BUTTON
- PDB POWER DISTRIBUTION BLOCK
- PIT PRESSURE INDICATING TRANSMITTER
- RIO REMOTE I/O PANEL
- POT POTENTIOMETER
- PM PHASE MONITOR
- PS POWER SUPPLY
- RCR RUN COMMAND RELAY
- RES RESISTOR
- S SWITCH
- SP SURGE PROTECTOR
- SS SELECTOR SWITCH
- SSRV SOLID STATE REDUCED VOLTAGE STARTER
- TB TERMINAL BOARD, TERMINAL BLOCK
- TC TIME CLOCK
- TR TIME DELAY RELAY
- TS TEMPERATURE SWITCH
- VFD VARIABLE FREQUENCY DRIVE
- XFMR TRANSFORMER
- ZS LIMIT SWITCH

NOTES:  
ALL SYMBOLS MAY NOT BE UTILIZED FOR THIS PROJECT.  
ADDITIONAL SYMBOLS NOT SHOWN ON THIS DRAWING MAY BE SHOWN ELSEWHERE ON THE ELECTRICAL DRAWINGS.

REV	DESCRIPTION	DATE
2	REVISED	AUG-2024
1	REVISED	OCT-2023
0	STANDARDS	MAR-2023

REVISIONS

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### CHARLOTTE COUNTY UTILITIES - REMOTE SITES CONTROL PANEL STANDARDS

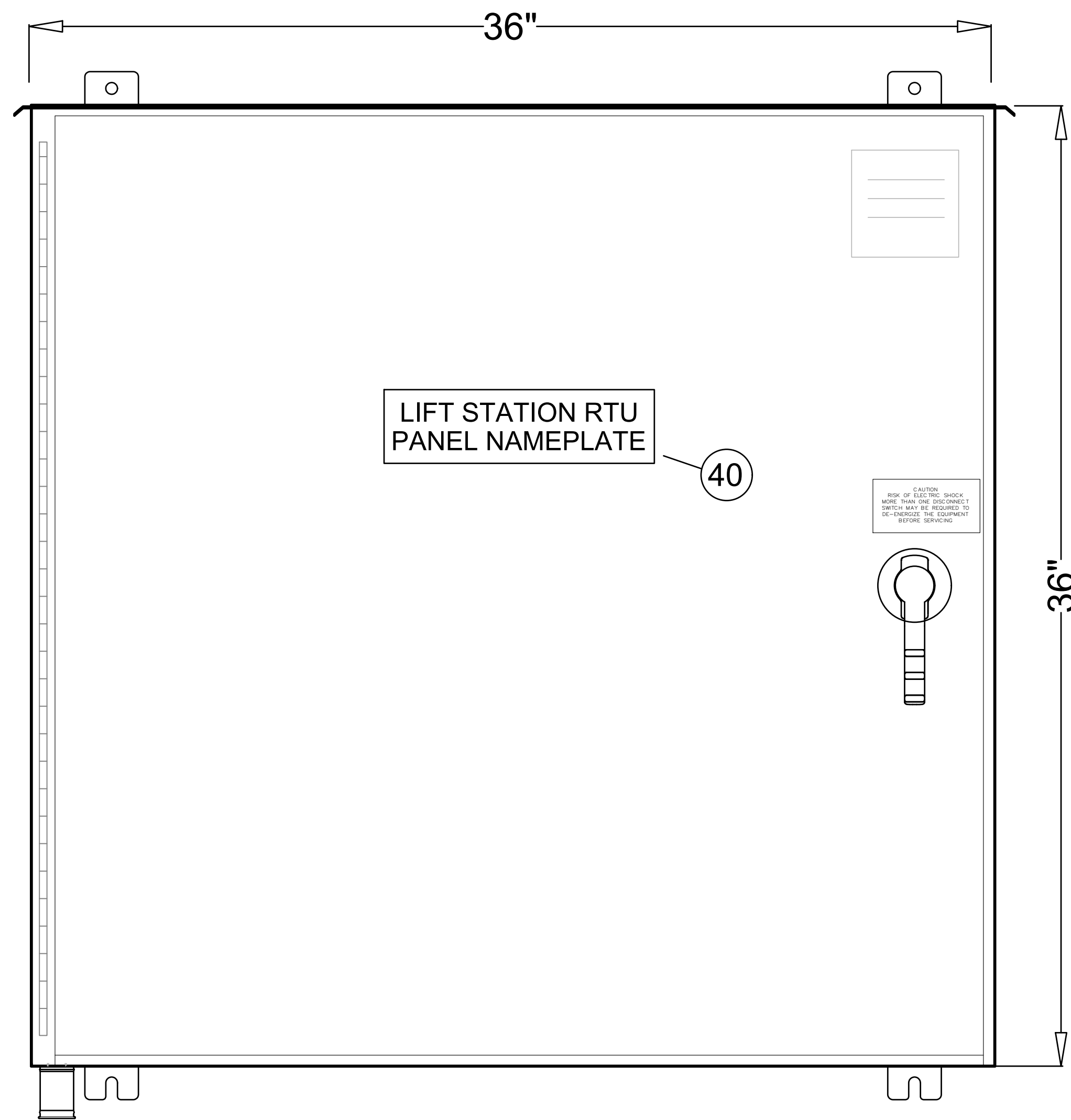
#### LIFT STATION RTU PANEL ELECTRICAL SYMBOLS

DATE: OCTOBER 2023	
MCE PROJ. # 07169-0012	
DRAWN: CJA	
DESIGNED: CJA	
CHECKED: EEB	
PROJ. MGR.: EEB	

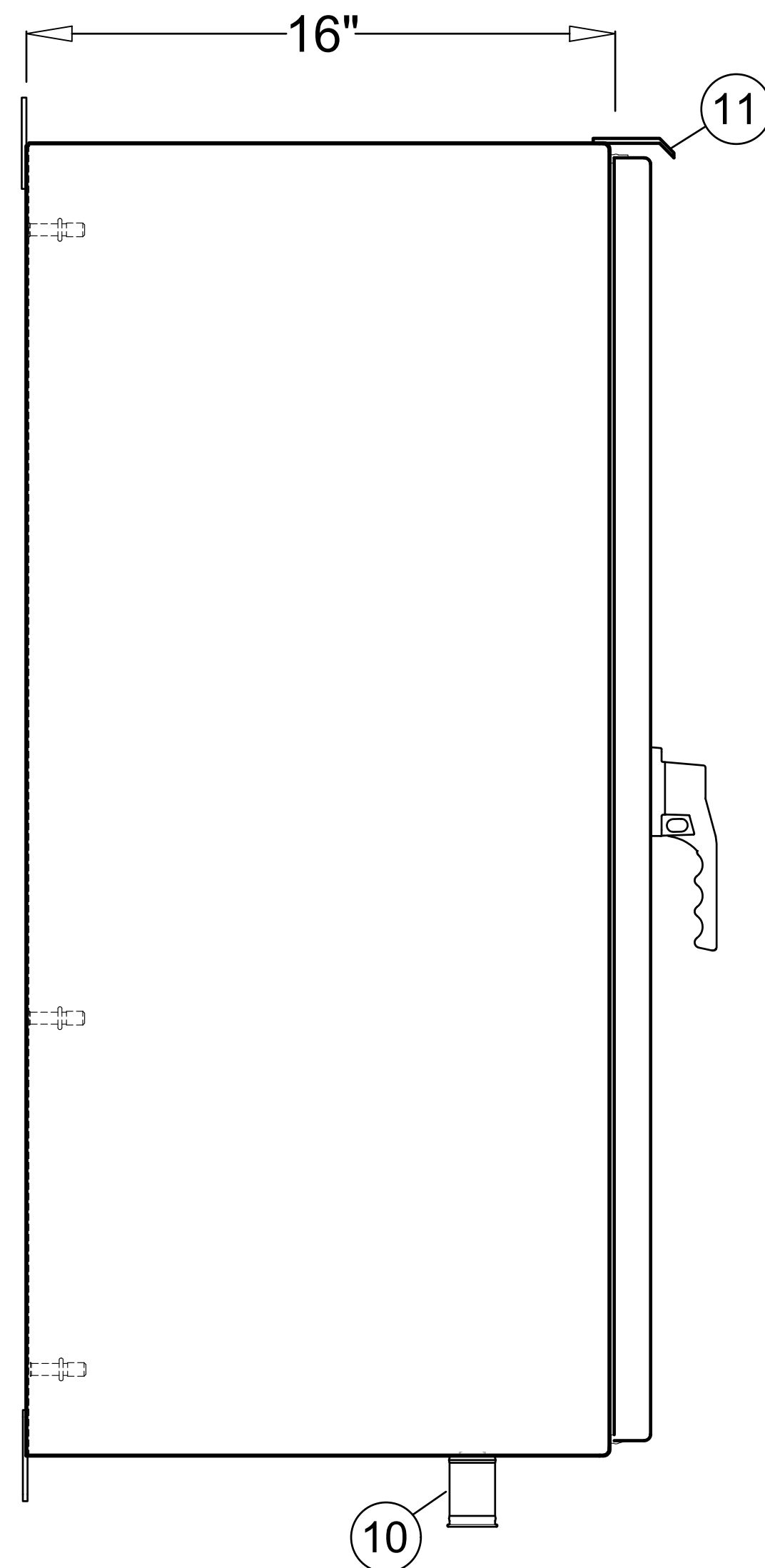
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DRAWING NO.	E4.1
REVISION	1

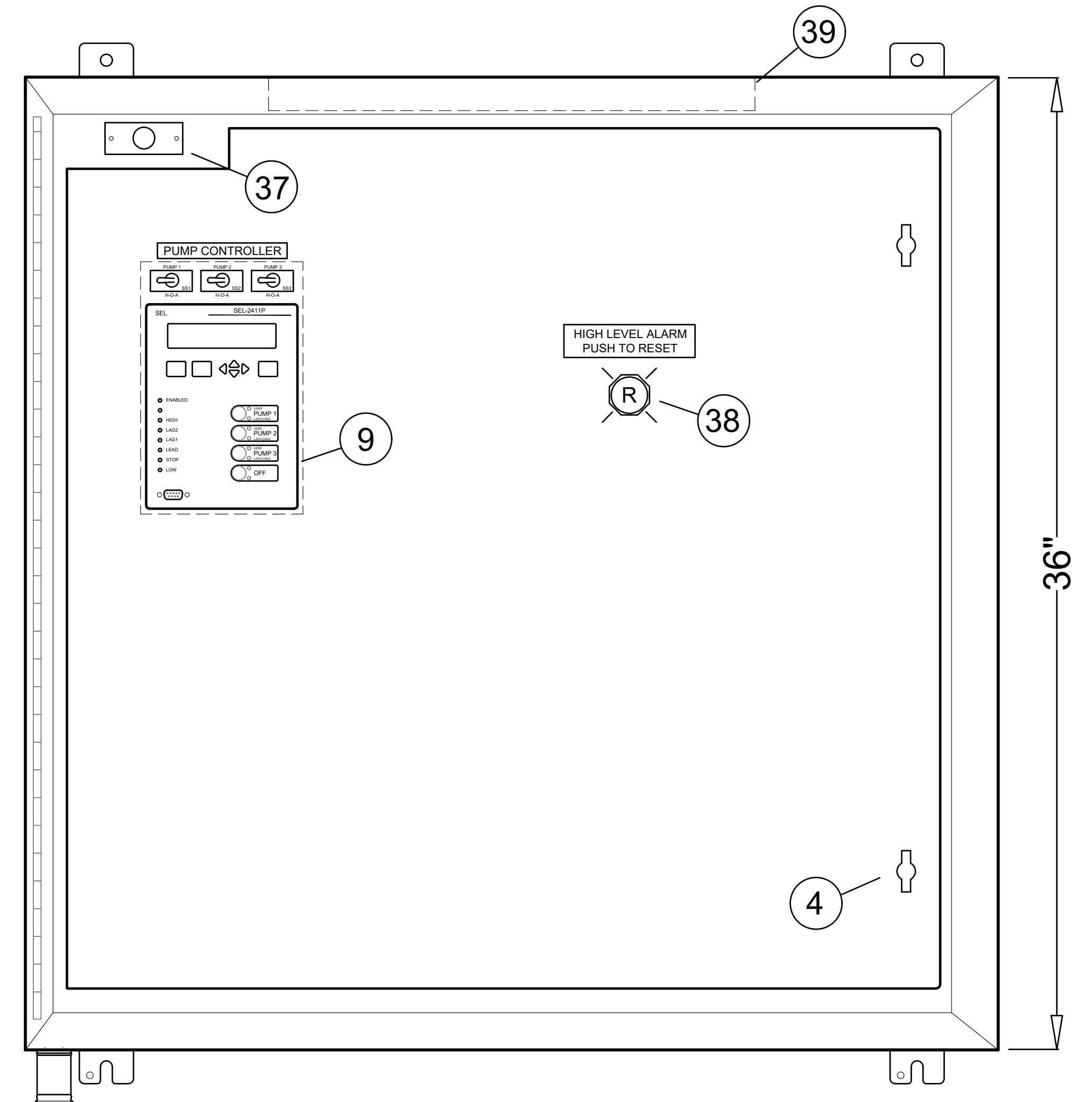
STATUS:



FRONT ENCLOSURE VIEW



LEFT SIDE VIEW



INNER DOOR VIEW

NOTE: ITEM NUMBERS REFER TO BILL OF MATERIALS SHOWN ON SHEET E4.3

REV	DESCRIPTION	DATE
2	REVISED	AUG-2024
1	REVISED	OCT-2023
0	STANDARDS	MAR-2023
REVISIONS		

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CHARLOTTE COUNTY UTILITIES - REMOTE SITES CONTROL PANEL STANDARDS

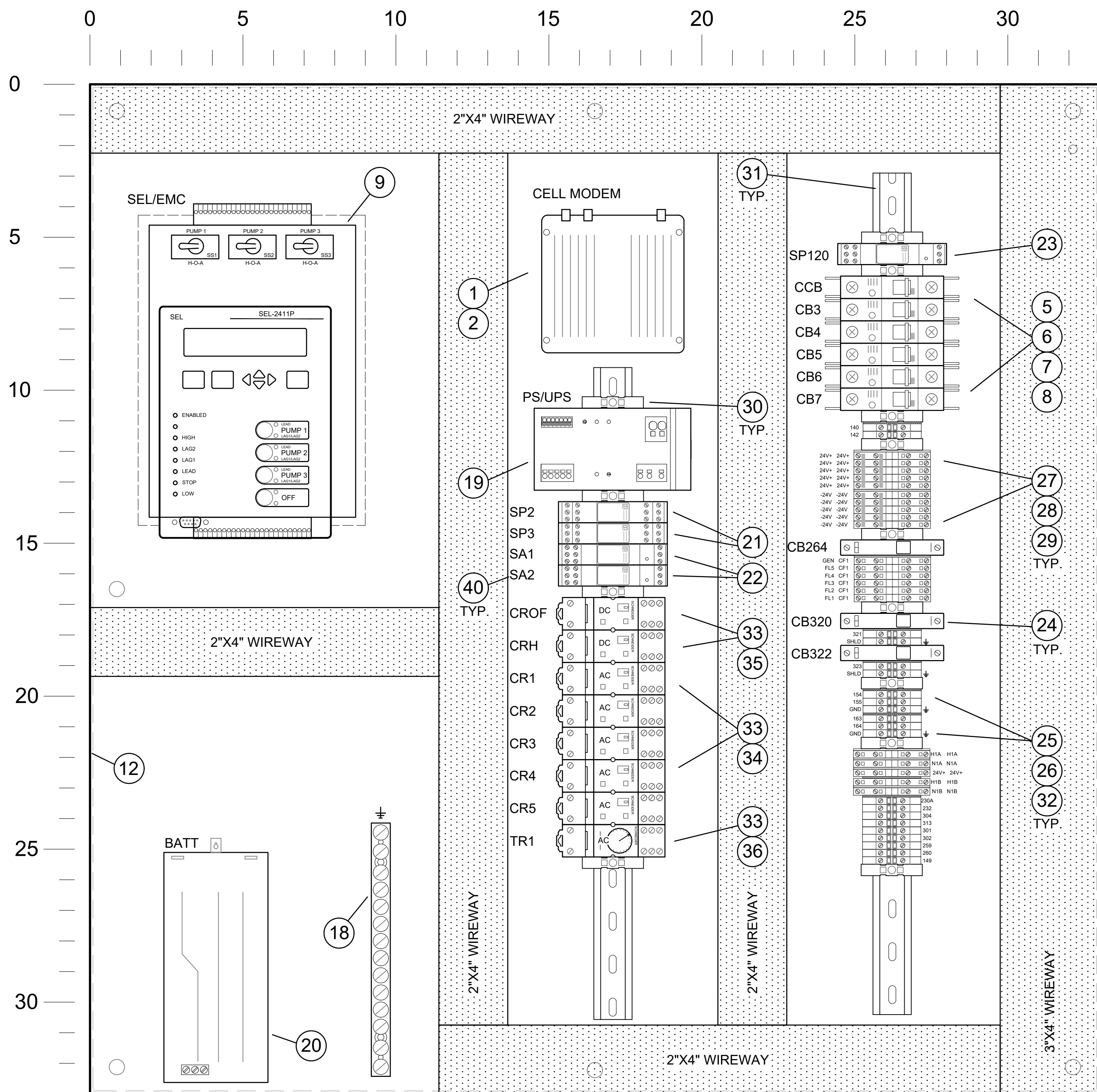
LIFT STATION RTU PANEL  
RTU ENCLOSURE DETAILS

DATE: OCTOBER 2023
MCE PROJ. # 07169-0012
DRAWN: CJA
DESIGNED: CJA
CHECKED: EEB
PROJ. MGR.: EEB

SCALE
HORIZONTAL:
VERTICAL:

**E4.2**  
DRAWING NO.  
1  
REVISION

STATUS:



BACKPANEL VIEW

ID	QTY	MANUFACTURER	CATALOG NUMBER	DESCRIPTION
1	1	CRADLEPOINT	S700-C4D-WIRELESS ROUTER	CRADLEPOINT S700 SERIES, VERIZON
2	1	CRADLEPOINT	170656-002	RADIO DIN RAIL BRACKET
3	1	CRADLEPOINT	698-2700MHz 12dBi	WIDE-BAND WIFI 4G LTE & 5G GSM UMTS CDMA 12DBI OUTDOOR OMNI DIRECTIONAL CELLULAR ANTENNA
4	1	CUSTOM	PANEL SHOP	12GA. STEEL INNER DOOR DEADFRONT, BLACK POLYESTER POWDERCOATED
5	1	EATON	FAZ-C15/1-NA	CIRCUIT BREAKER, 15 AMP
6	1	EATON	FAZ-C10/1-NA	CIRCUIT BREAKER, 10 AMP
7	3	EATON	FAZ-C5/1-NA	CIRCUIT BREAKER, 5 AMP
8	1	EATON	FAZ-C3/1-NA	CIRCUIT BREAKER, 3 AMP
9	1	EMC/SEL	CUSTOM	SEL-2411P CONTROLLER EMC WITH HOUSING KIT AND WIRING HARNESS
10	1	HOFFMAN	AVDR4SS4	H20MIT VENT DRAIN, 4X, 304 STAINLESS STEEL
11	1	HOFFMAN	A36H3616SS6LP3PT-CUSTOM	36"H X 36"W X 16"D TYPE 4X SS 316 ENCLOSURE WITH DRIPSHIELD
12	1	HOFFMAN	A36P36	BACKPANEL FOR 36"X36" ENCLOSURE
14	1	PANDUIT	F2X4LG6	SLOTTED WIREWAY, GRAY, 2"X4", 6' STICK
15	1	PANDUIT	C2LG6	2" WIREWAY COVER, GRAY, 6' STICK
16	1	PANDUIT	F3X4LG6	SLOTTED WIREWAY, GRAY, 3"X4", 6' STICK
17	1	PANDUIT	C3LG6	3" WIREWAY COVER, GRAY, 6' STICK
18	1	PANDUIT	UGB2-0-414-12	GROUND BAR, #14-4AWG
19	1	PHOENIX CONTACT	2907161	24VDC UPS AND POWER SUPPLY MODULE, 10 AMP
20	1	PHOENIX CONTACT	1274117	24VDC BACKUP BATTERY, 4 Ah
21	2	PHOENIX CONTACT	2800982	PLUG TRAB SURGE PROTECTOR WITH BASE, 24VDC, 4-POINT
22	2	PHOENIX CONTACT	2800976	ANALOG SIGNAL SURGE PROTECTOR WITH BASE
23	1	PHOENIX CONTACT	2907918	120VAC SURGE PROTECTOR WITH STATUS, PLUG AND BASE
24	2	PHOENIX CONTACT	0916603	THERMOMAGNETIC DEVICE CIRCUIT BREAKER, 1/2A
25	15	PHOENIX CONTACT	3044102	STANDARD TERMINAL BLOCK, 30A
26	5	PHOENIX CONTACT	3047028	STANDARD TERMINAL BLOCK END BARRIER
27	30	PHOENIX CONTACT	3044814	2-TIER ISOLATED TERMINAL BLOCK
28	6	PHOENIX CONTACT	3047293	2-TIER TERMINAL BLOCK END COVER
29	8	PHOENIX CONTACT	3030271	2-TIER TERMINAL BLOCK JUMPER BRIDGE
30	15	PHOENIX CONTACT	0800886	DIN RAIL END BRACKET
31	1	PHOENIX CONTACT	0801733	STANDARD DIN RAIL, 2M
32	5	PHOENIX CONTACT	30-44-12-8	GROUNDING TERMINAL BLOCK
33	8	SCHNEIDER	70-782EL8-1	RELAY BASE, 8-PIN
34	5	SCHNEIDER	792XBXM4L-120A	DPDT RELAY, 120VAC, WITH INDICATOR AND TEST LATCH
35	2	SCHNEIDER	792XBXM4L-24D	DPDT RELAY, 24VDC, WITH INDICATOR AND TEST LATCH
36	1	SCHNEIDER	TDR782XBXA-110A	DPDT ON-DELAY TIMER, 120VAC
37	1	SQUARE D	9007MS02S0200	INTRUSION SWITCH WITH MOUNTING BRACKET
38	1	SQUARE D	9001K1L1RH13	ILLUMINATED PUSHBUTTON, RED, 120V, 1NO-1NC
39	1	UTILTECH	0877623	UNDERCABINET LIGHT, 120VAC, WITH 18' LED BULB
40	-	CUSTOM	PANEL SHOP	ENGRAVED PHENOLIC NAMEPLATES, WHITE TEXT WITH BLACK BACKGROUND

BILL OF MATERIALS

NOTES:

- BILL OF MATERIALS IS PROVIDED FOR EXAMPLE ONLY. PANEL COMPONENTS WILL VARY WITH EACH SPECIFIC LIFT STATION. CONTROL PANEL MANUFACTURER TO PROVIDE A COMPLETE LIST OF CONTROL PANEL MATERIALS FOR COUNTY APPROVAL BEFORE FABRICATION.
- CONTROL PANEL TO BE UL508A LISTED TYPE 4X.

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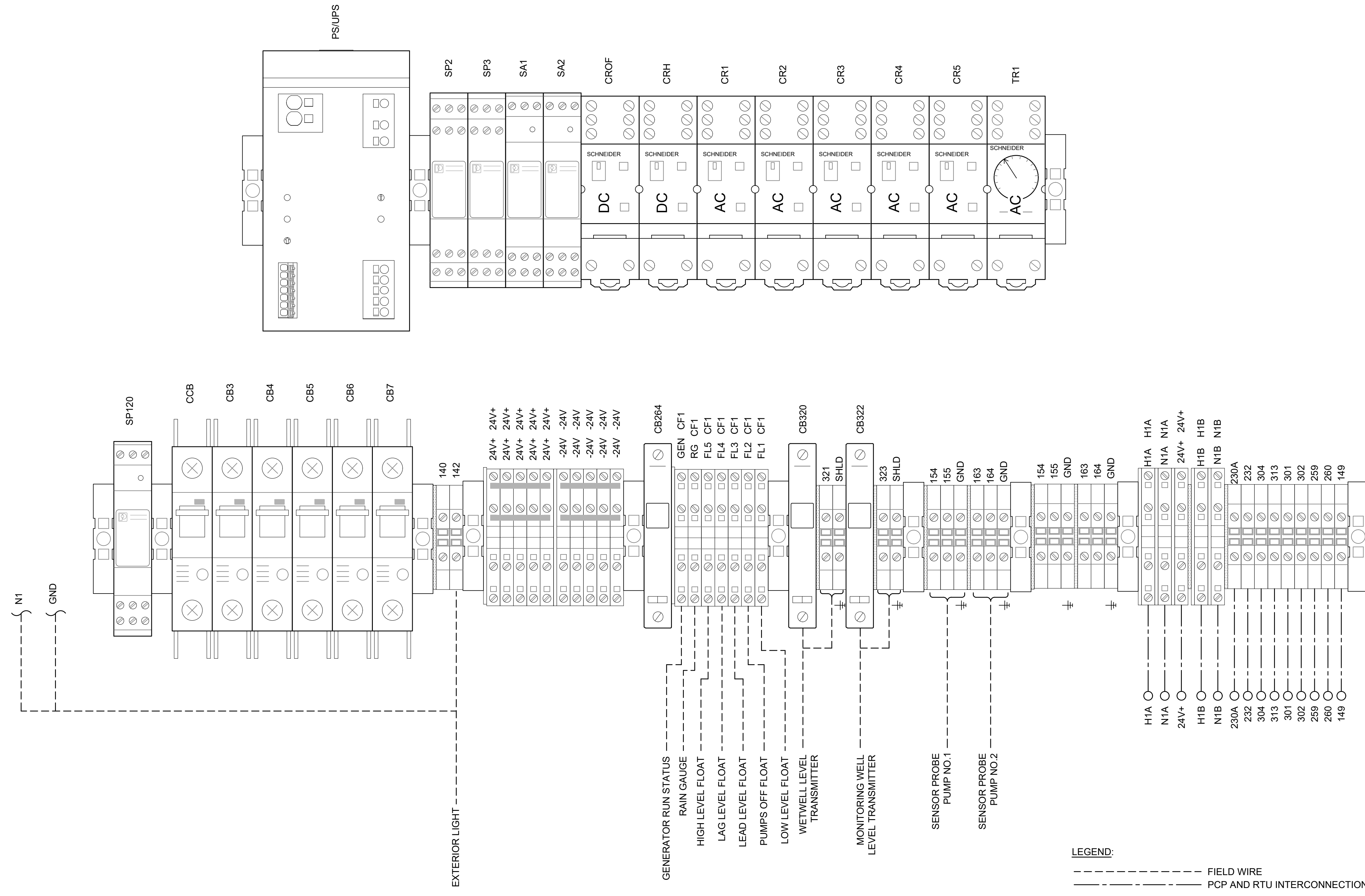
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CHARLOTTE COUNTY UTILITIES - REMOTE SITES CONTROL PANEL STANDARDS

LIFT STATION RTU PANEL BACKPANEL DETAILS AND BILL OF MATERIAL

DATE: OCTOBER 2023	SCALE: HORIZONTAL: E4.3
MCE PROJ. # 07169-0012	DRAWN: CJA
DESIGNED: CJA	CHECKED: EEB
PROJ. MGR: EEB	REVISION: 1



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**CHARLOTTE COUNTY UTILITIES - REMOTE SITES CONTROL PANEL STANDARDS**

**LIFT STATION RTU PANEL**

**TERMINAL BLOCK AND EXTERNAL CONNECTION PANEL**

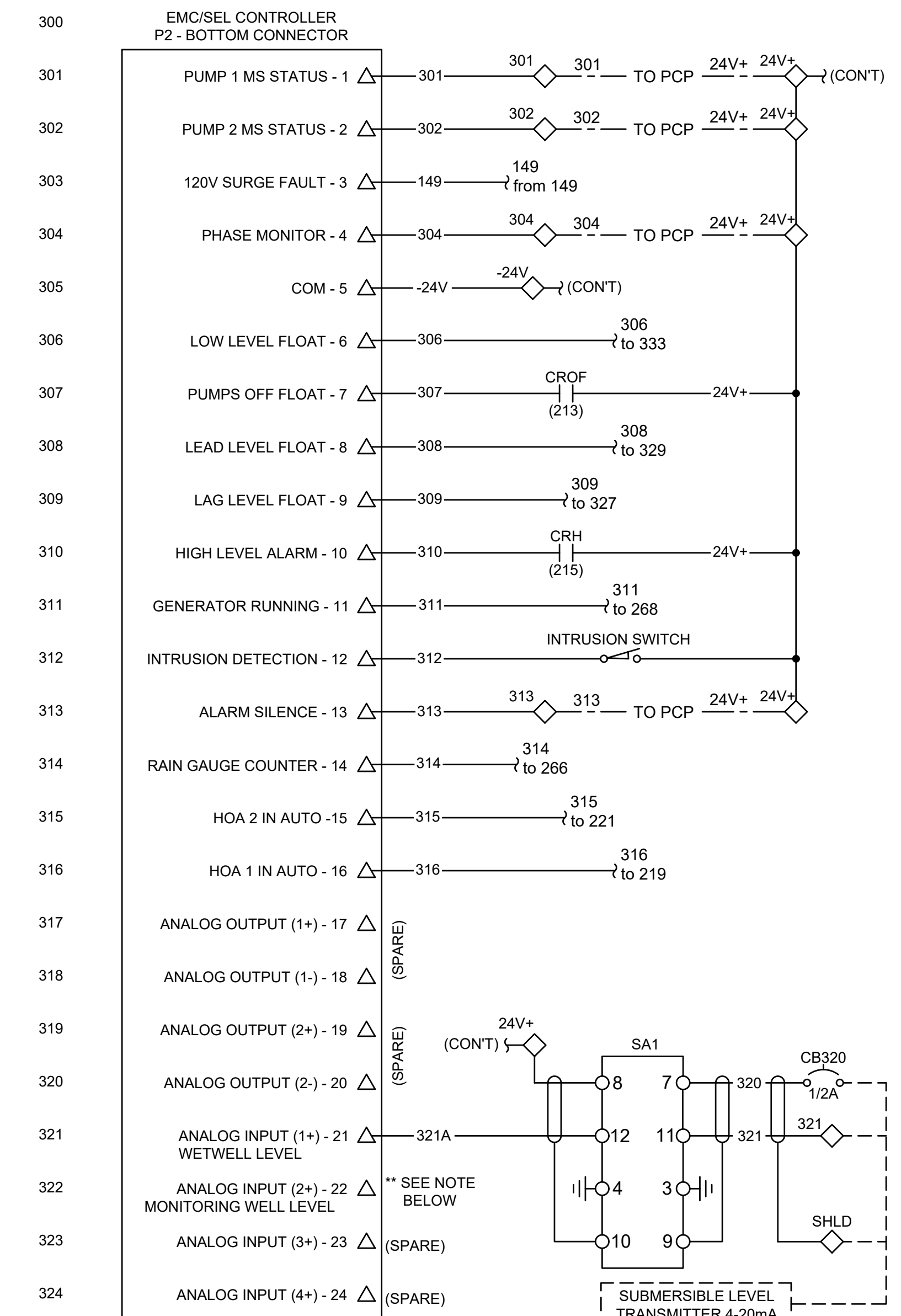
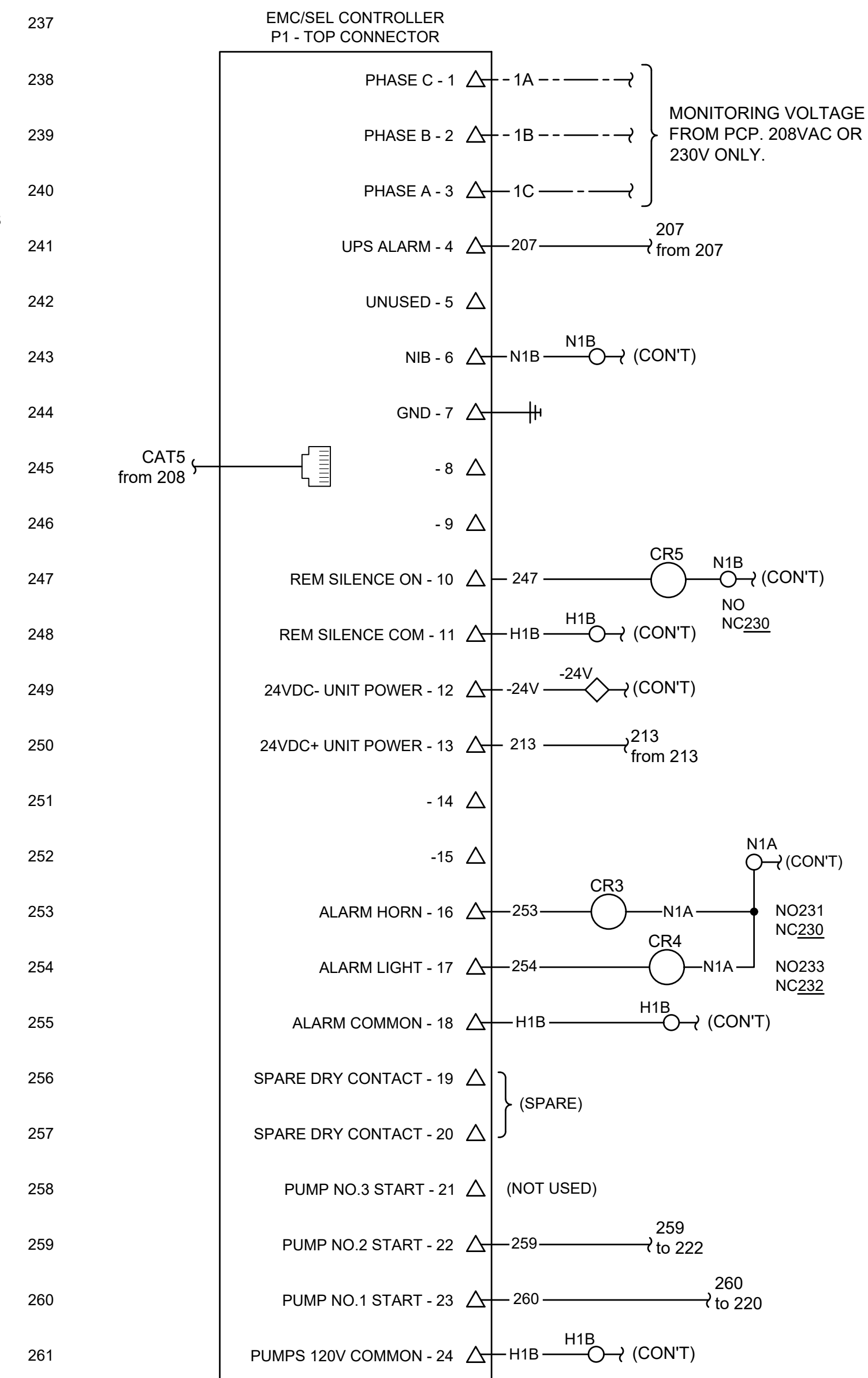
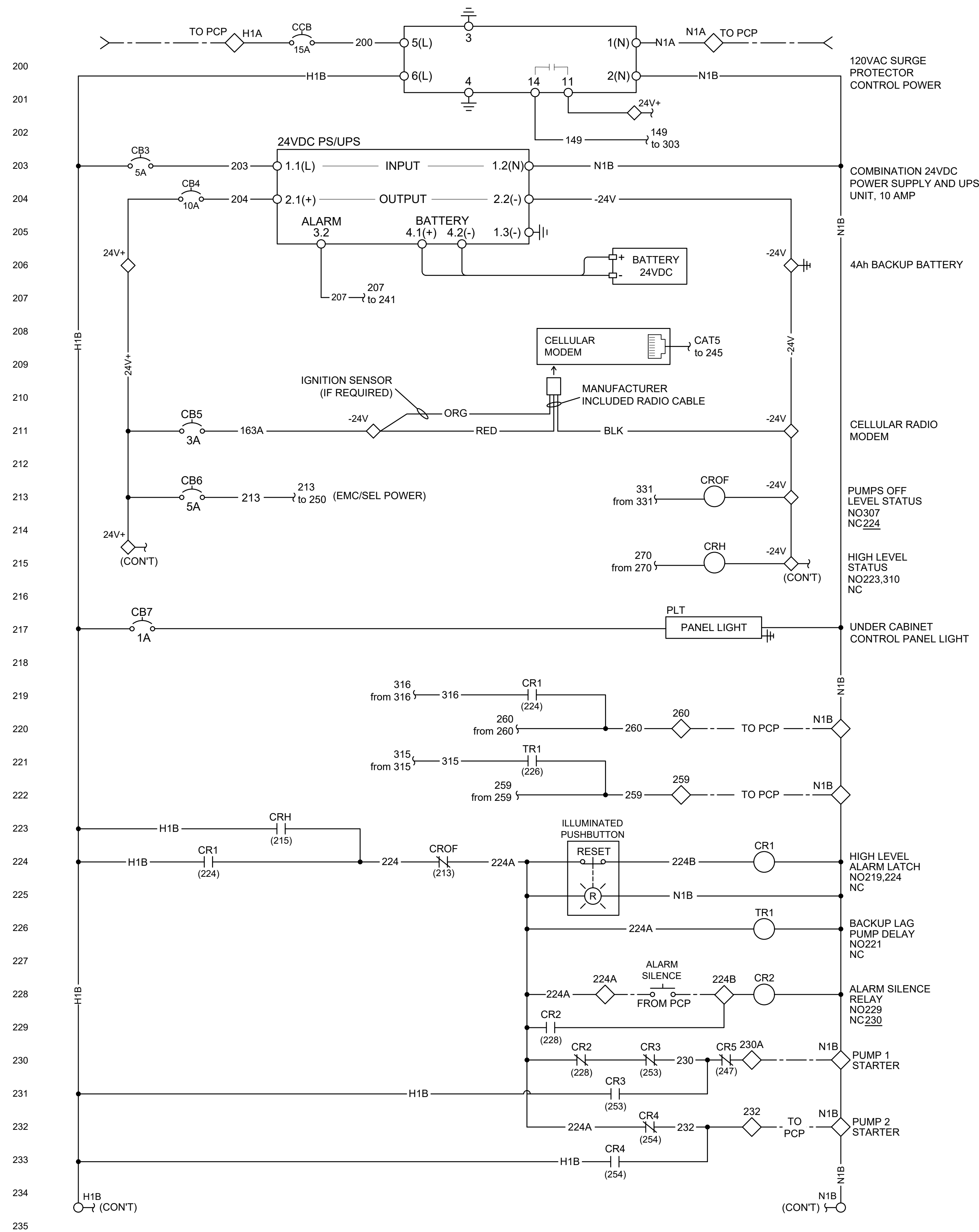
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CHECKED: EEB	
PROJ. MGR.: EEB	

**E4.4**

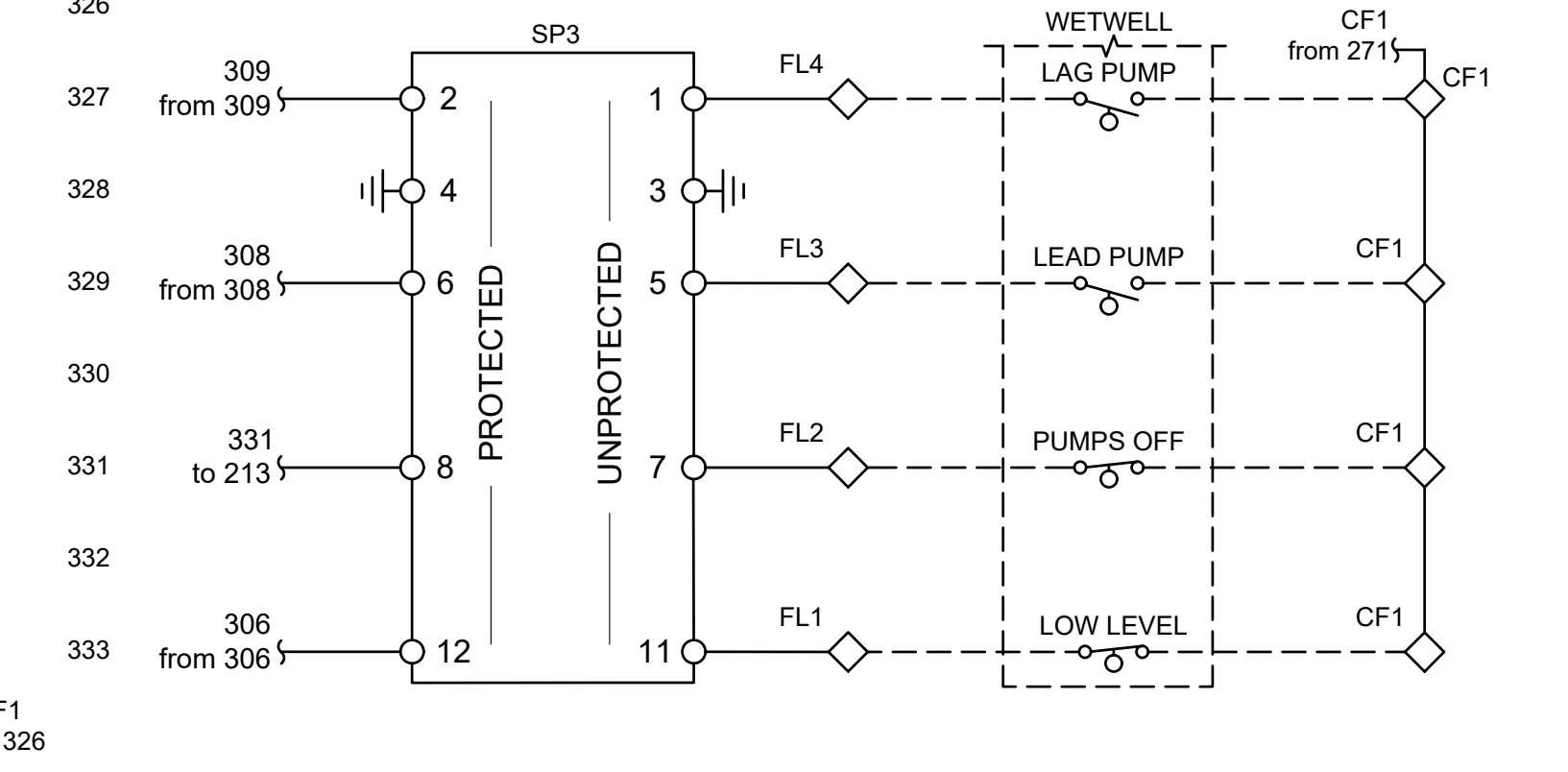
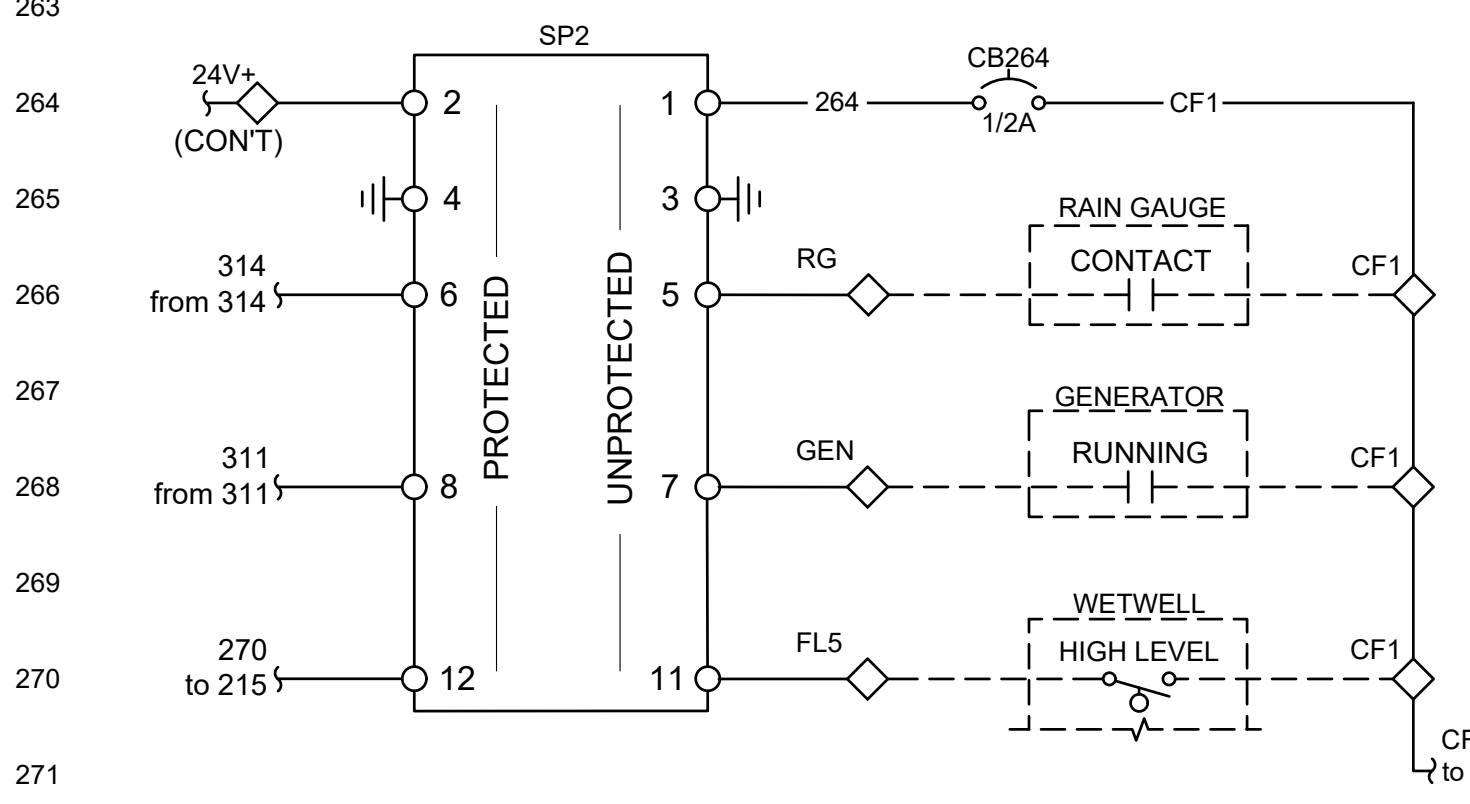
DRAWING NO.

1

REVISION



\*\* FOR STATIONS WITH A MONITORING WELL ADD ADDITIONAL SURGE PROTECTOR, CIRCUIT BREAKER, AND TERMINALS SIMILAR THE ABOVE SHOWN ANALOG INPUT. REFER TO E4.4 FOR DETAIL.



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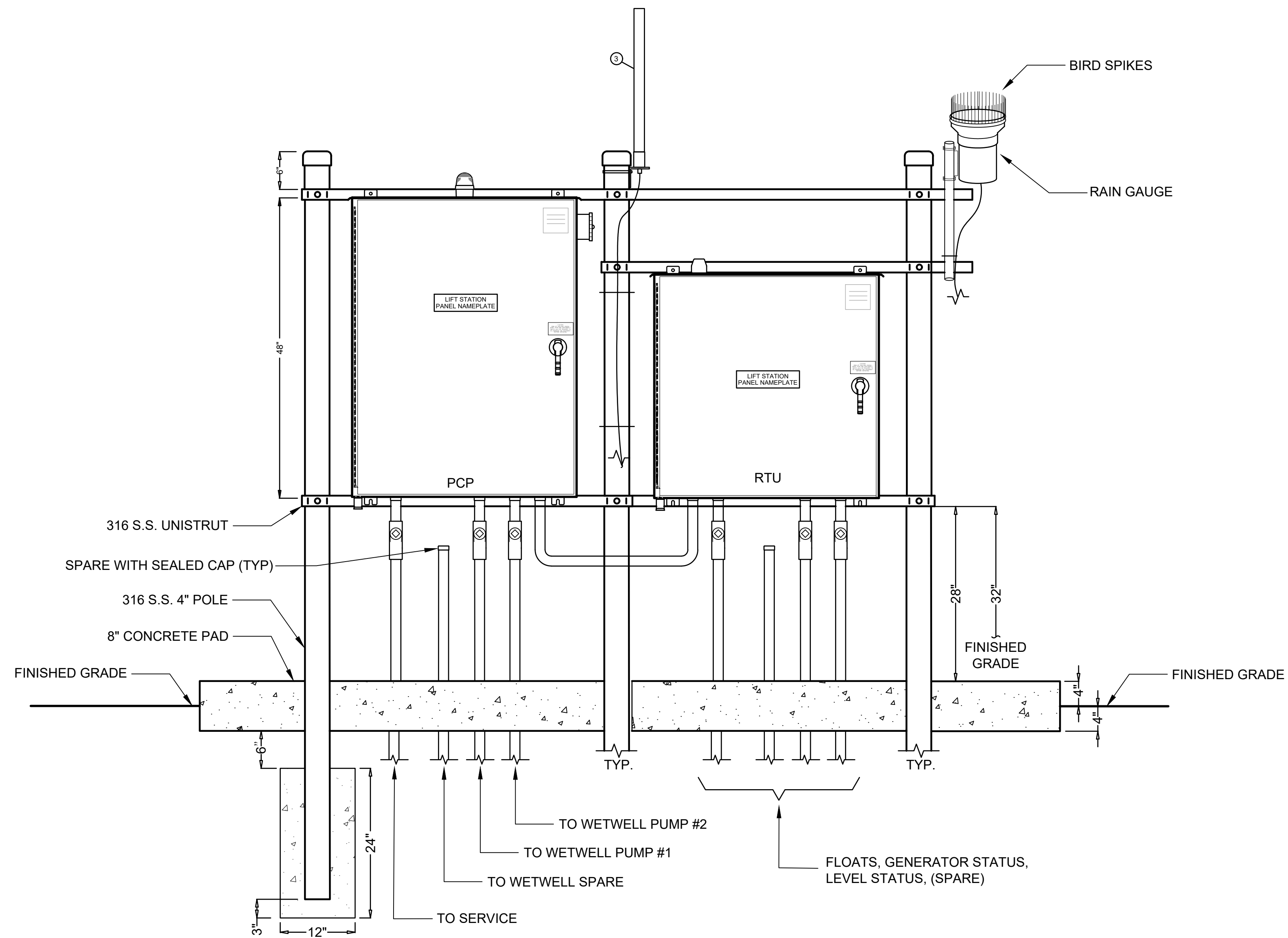
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CHARLOTTE COUNTY UTILITIES - REMOTE SITES CONTROL PANEL STANDARDS

LIFT STATION RTU PANEL CONTROL AND EMC-SEL DIAGRAM

DATE: OCTOBER 2023	SCALE: HORIZONTAL: E4.5
MCE PROJ. # 07169-0012	VERTICAL: 1 REVISION
DRAWN: CJA	
DESIGNED: CJA	
CHECKED: EEB	
PROJ. MGR.: EEB	
STATUS:	



FRONT MOUNTING VIEW EXAMPLE

DETAIL NOTES:

1. CONDUIT(S) DEPICTED ON FRONT ELEVATIONS ARE SHOWN TO CONVEY DESIGN INTENT AND DO NOT DEPICT ACTUAL SIZES OR QUANTITIES. CONTRACTOR SHALL REFERENCE ALL PROJECT SPECIFIC ENGINEERING DRAWINGS FOR MINIMUM CONDUIT AND CONDUCTOR REQUIREMENTS AND COORDINATE WITH CCU.
2. ALL EXPOSED CONDUIT SHALL BE RIGID TYPE 316 STAINLESS STEEL CONDUIT. UNDERGROUND CONDUIT TO THE WETWELL SHALL BE SCHEDULE 80 PVC.
3. GROUND CONDUIT SHALL BE 1/2" SCHEDULE 80 PVC. GROUND WIRE TO BE SIZE NUMBER 6.
4. THE PUMP CONTROL PANEL/RTU PANEL SHALL HAVE A PAD LOCKABLE HANDLE, 3-POINT LATCH.
5. ALL CONDUIT(S) SHALL ENTER THE BOTTOM OF ALL ENCLOSURES WITH DIE-CAST STAINLESS STEEL CONDUIT HUBS - CHASE/CLOSE CONDUIT NIPPLES AND SIDE ENTRIES ARE NOT ACCEPTABLE.
6. TEXAS ELECTRONICS TR-525USW TIPPING BUCKET RAIN GAUGE WITH DRY CONTACT AND BIRD SPIKES. MOUNT TO EQUIPMENT RACK.

REV	DESCRIPTION	DATE
2	REVISED	AUG-2024
1	REVISED	OCT-2023
0	STANDARDS	MAR-2023
REVISIONS		

CHARLOTTE COUNTY UTILITIES DEPARTMENT

NOTE: PROVIDED FOR INFORMATIONAL PURPOSES ONLY. NO MODIFICATIONS WITHOUT WRITTEN CCU APPROVAL. FOR EACH INSTALLATION A SPECIFIC SET OF CONSTRUCTION DRAWINGS AND SPECIFICATIONS (IF DEEMED NECESSARY BY THE DESIGN ENGINEER) MUST BE PREPARED.



CHARLOTTE COUNTY UTILITIES - REMOTE SITES CONTROL PANEL STANDARDS

LIFT STATION RTU PANEL  
PANEL MOUNTING DETAIL

DATE: OCTOBER 2023	SCALE
MCE PROJ. # 07169-0012	HORIZONTAL: E4.6
DRAWN: CJA	VERTICAL: 1
DESIGNED: CJA	REVISION
CHECKED: EEB	
PROJ. MGR.: EEB	

STATUS: