

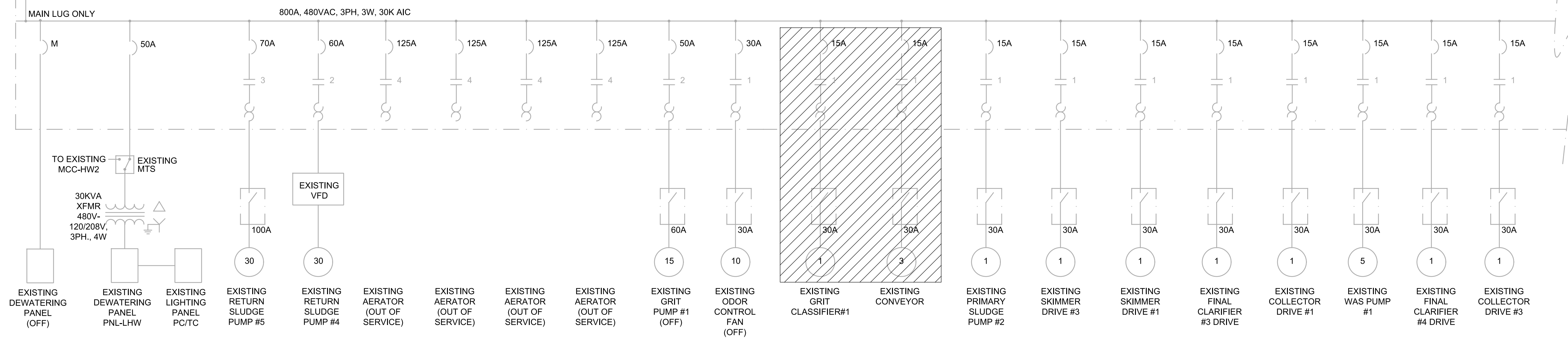
EXISTING 800A BREAKER
AT UNIT SUBSTATION#3
(LOCATION: HEADWORKS
ELECTRICAL ROOM)

LOAD SUMMARY MCC-HW1 (480V)

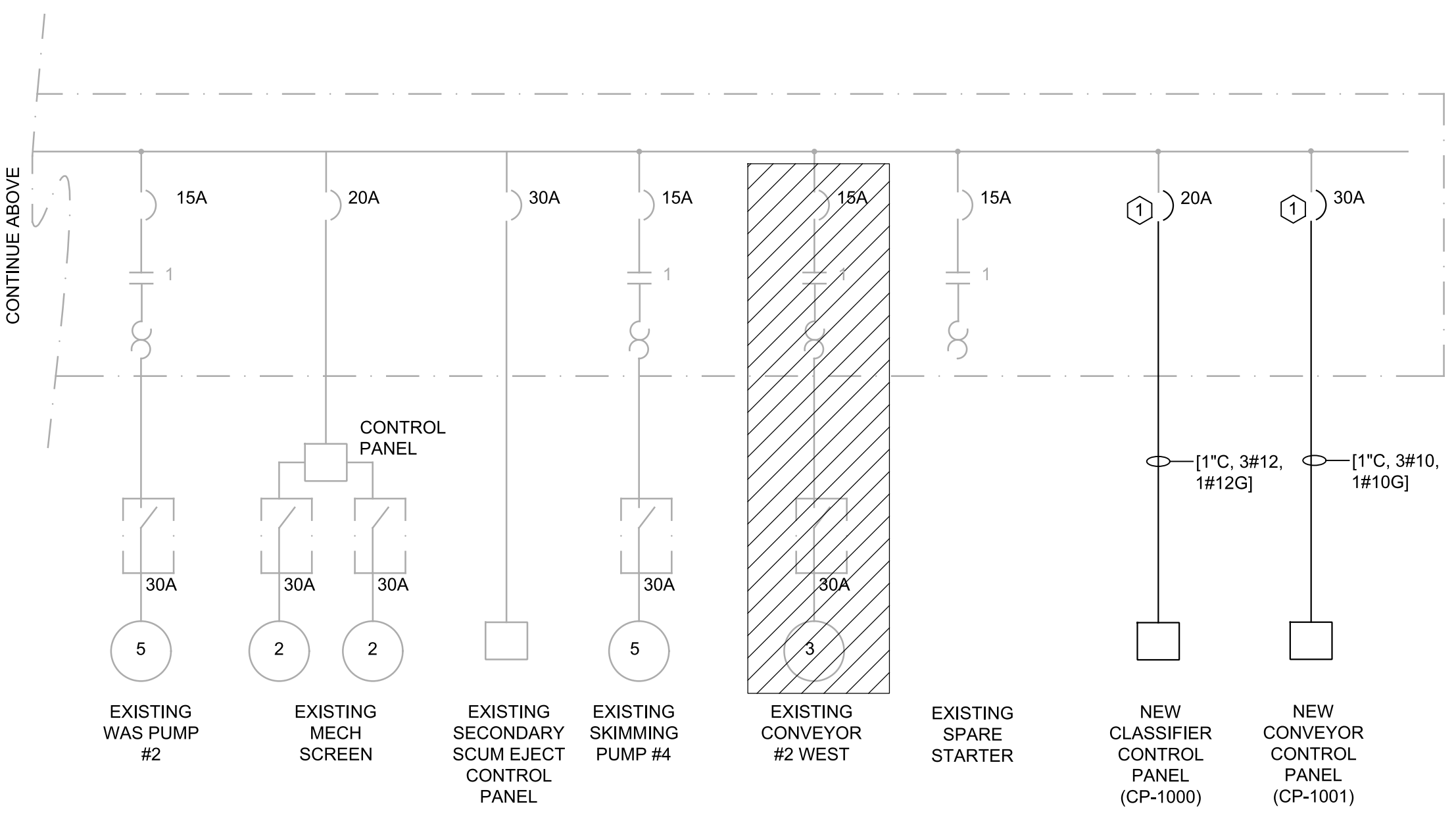
LOAD	CONNECTED LOAD (A)	RUNNING LOAD (A)
EXISTING LOADS	262.8 A	198.1 A
REMOVED LOADS	-11.7 A	-11.7 A
NEW CLASSIFIER CP (CP-1000)	4.2 A	4.2 A
NEW CONVEYOR CP (CP-1001)	15.2 A	15.2 A
TOTALS	270.5 A	205.8 A
KVA:	224.9 KVA	171.1 KVA

EXISTING MOTOR CONTROL CENTER- HW1

LOCATION: HEADWORKS ELECTRICAL ROOM



CONTINUE BELOW

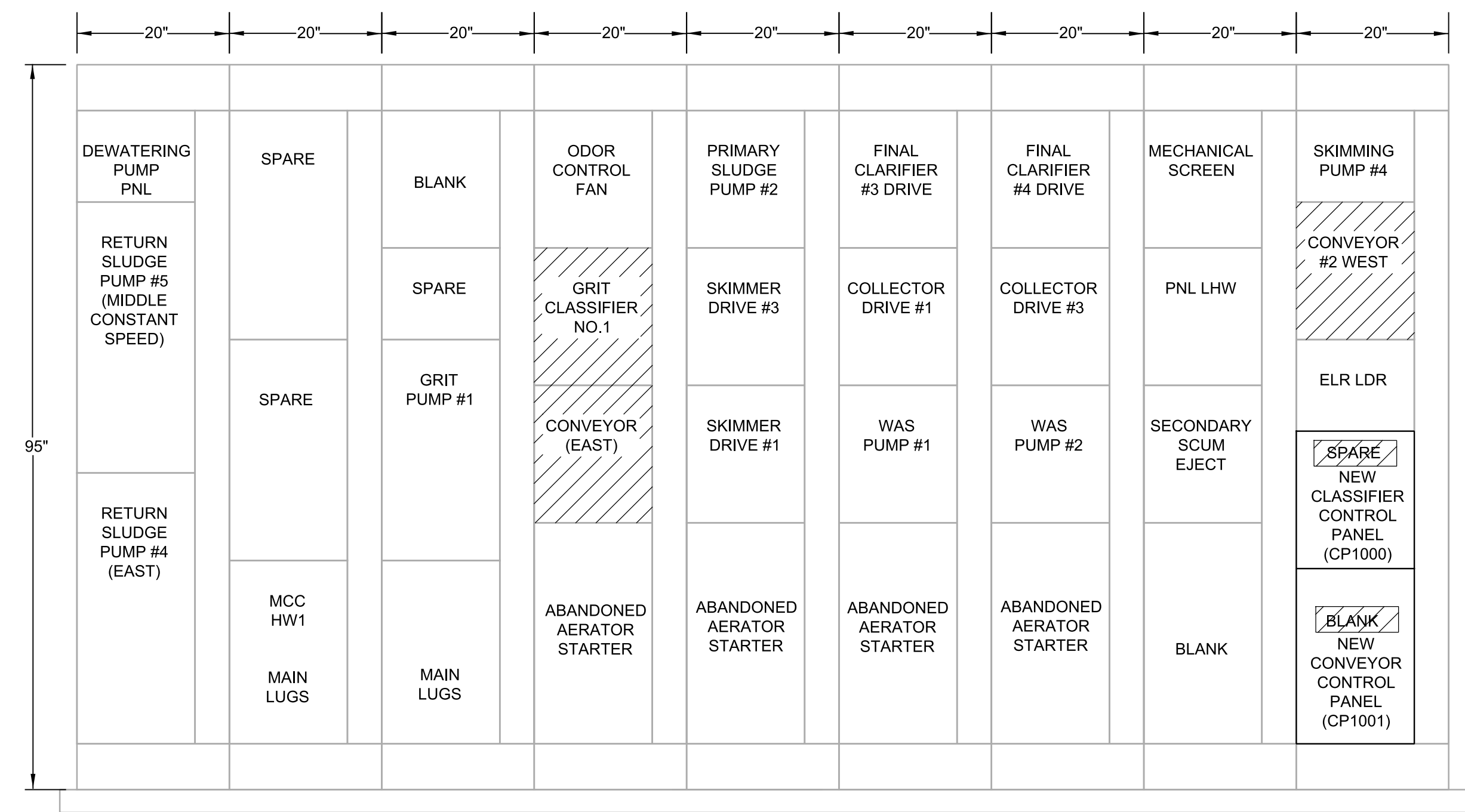


EXISTING MCC- HW1 ONE LINE

SCALE: NONE

KEY NOTE

Ⓛ PROVIDE AND INSTALL NEW BREAKERS IN EXISTING MCC-HW1 FOR NEW CLASSIFIER CONTROL PANEL AND NEW CONVEYOR CONTROL PANEL. NEW BREAKER SHALL MATCH THE STYLE AND AIC RATING WITH EXISTING BREAKERS. MAKE ALL NECESSARY CONNECTIONS, TERMINATIONS, ETC. FOR A COMPLETE AND WORKING MCC SYSTEM IN PLACE.



MCC- HW1 FRONT ELEVATION

SCALE: NONE

LAST SAVED BY: WTW

REV	DATE	BY	DESCRIPTION

DESIGNED	TW
DRAWN	DEU
CHECKED	PFH
DATE	SEPTEMBER 2012

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9185
(561) 451-4886 FAX
LICENSE NO: EB 0006877

THEIN WIN, P.E.
No. 65722



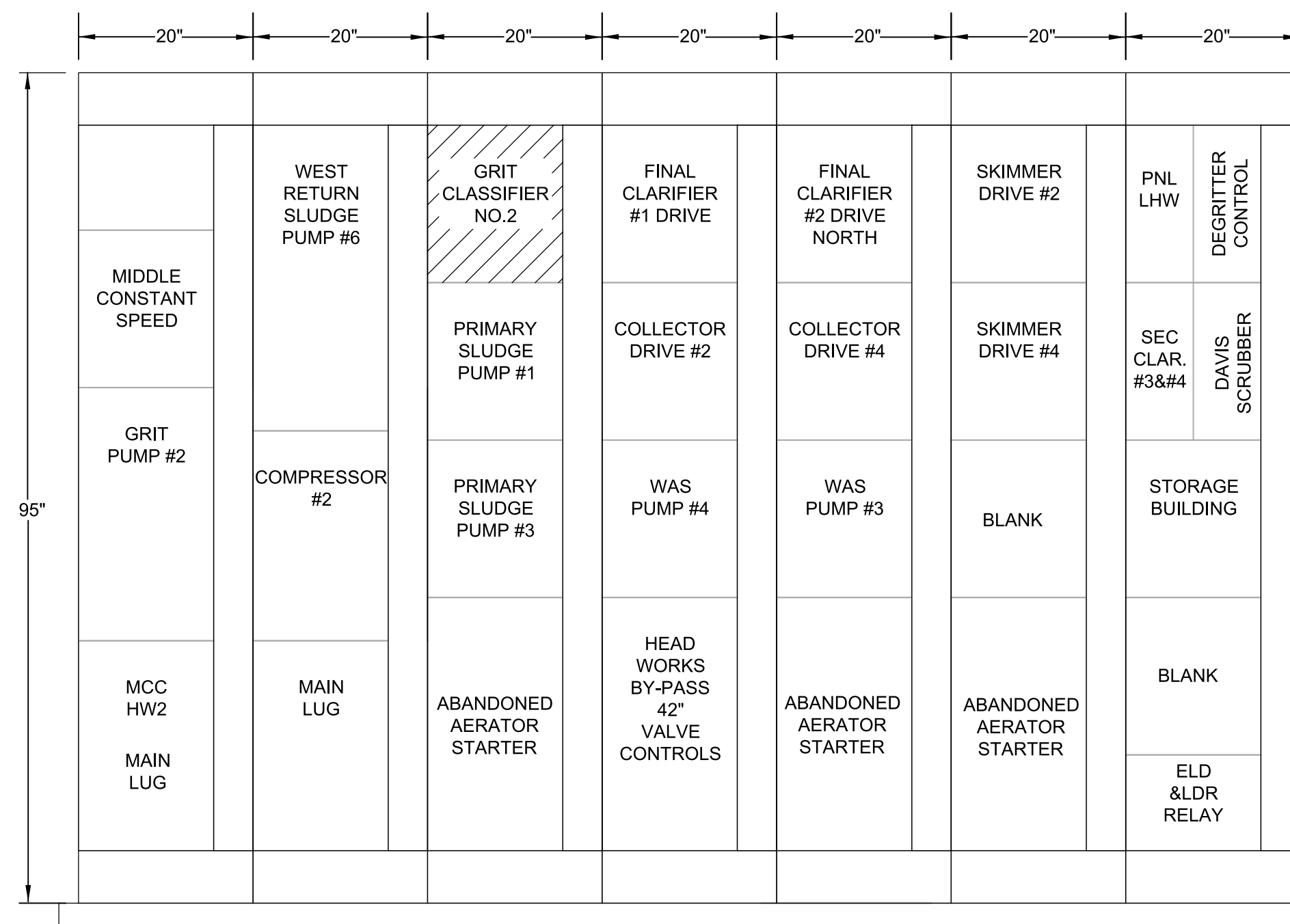
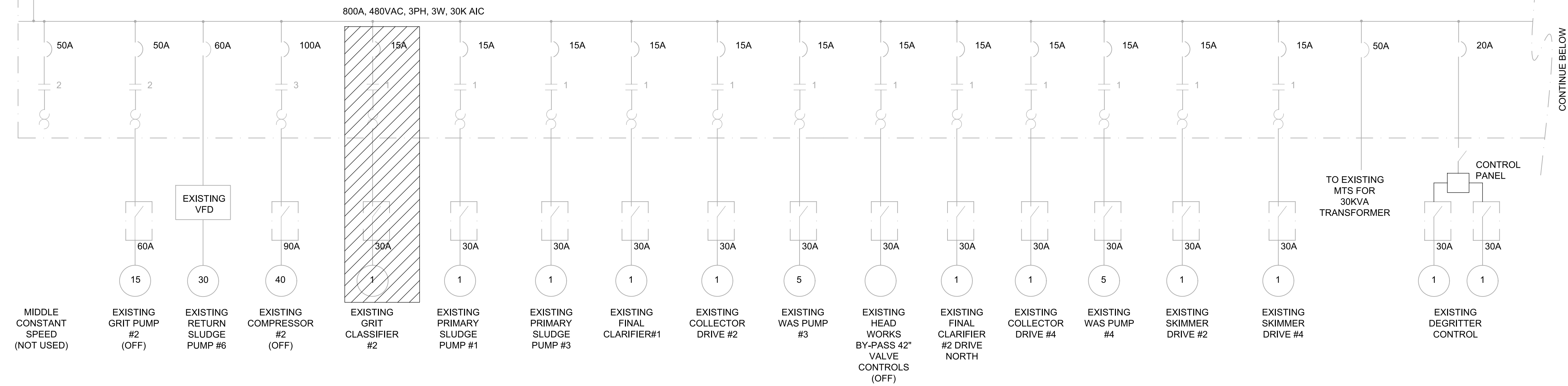
MANATEE COUNTY	
SWWRF HEADWORKS REHABILITATION	
ELECTRICAL	
EXISTING MCC-HW1 ONE LINE	

VERIFY SCALES	JOB NO. 7880K10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. E-3
0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

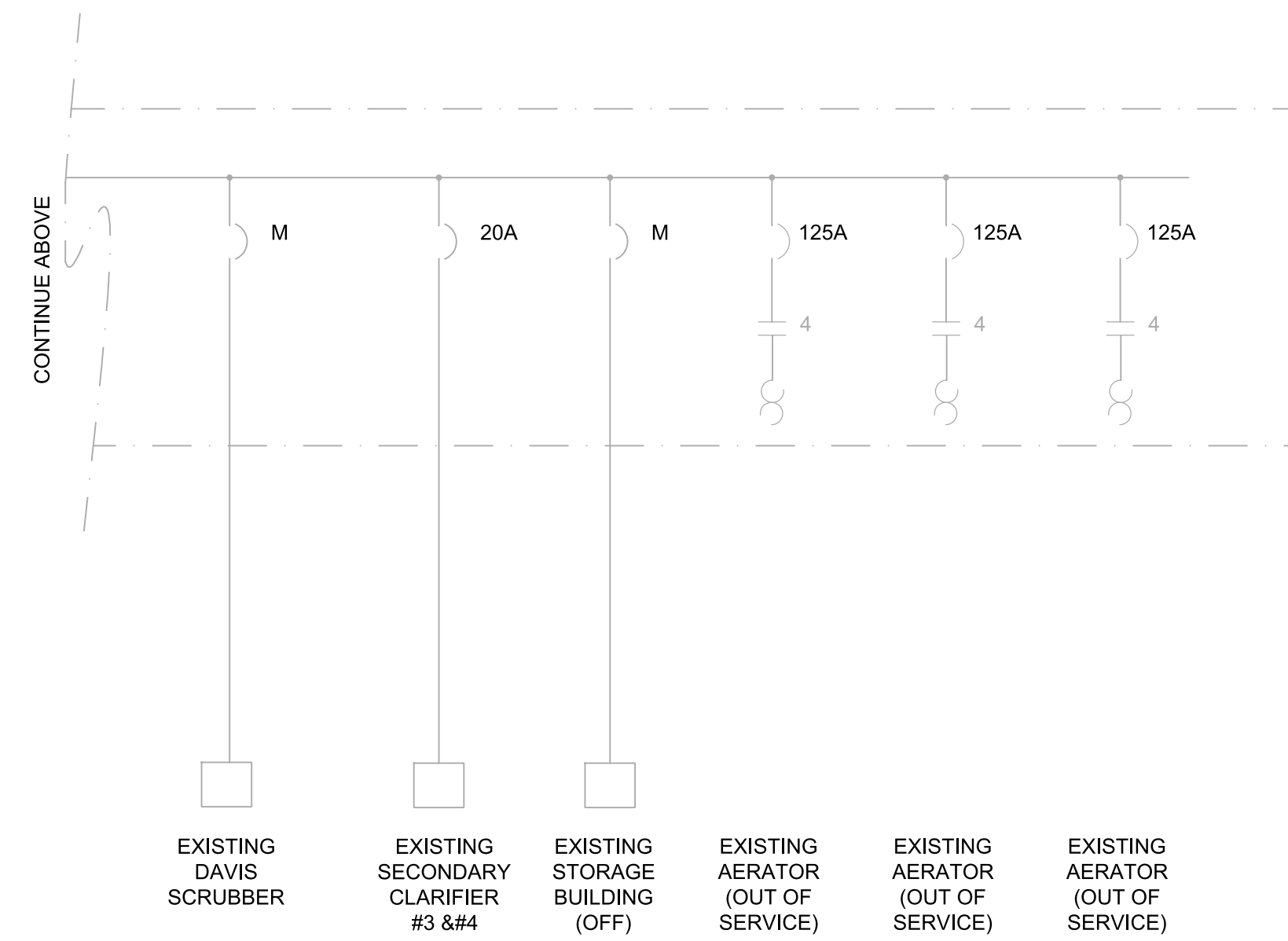
EXISTING 800A BREAKER
AT UNIT SUBSTATION#4
(LOCATION: HEADWORKS
ELECTRICAL ROOM)

EXISTING 2 SET [3 1/2" C,
3-500KCM, 1#1/0 G]

EXISTING MOTOR CONTROL CENTER- HW2
LOCATION: HEADWORKS ELECTRICAL ROOM



MCC- HW2 FRONT ELEVATION
SCALE: NONE



**EXISTING MCC- HW2 ONE LINE -
DEMOLITION**
SCALE: NONE

LAST SAVED BY: WTW

REV	DATE	BY	DESCRIPTION

DESIGNED TW
DRAWN DEU
CHECKED PFH
DATE SEPTEMBER 2012

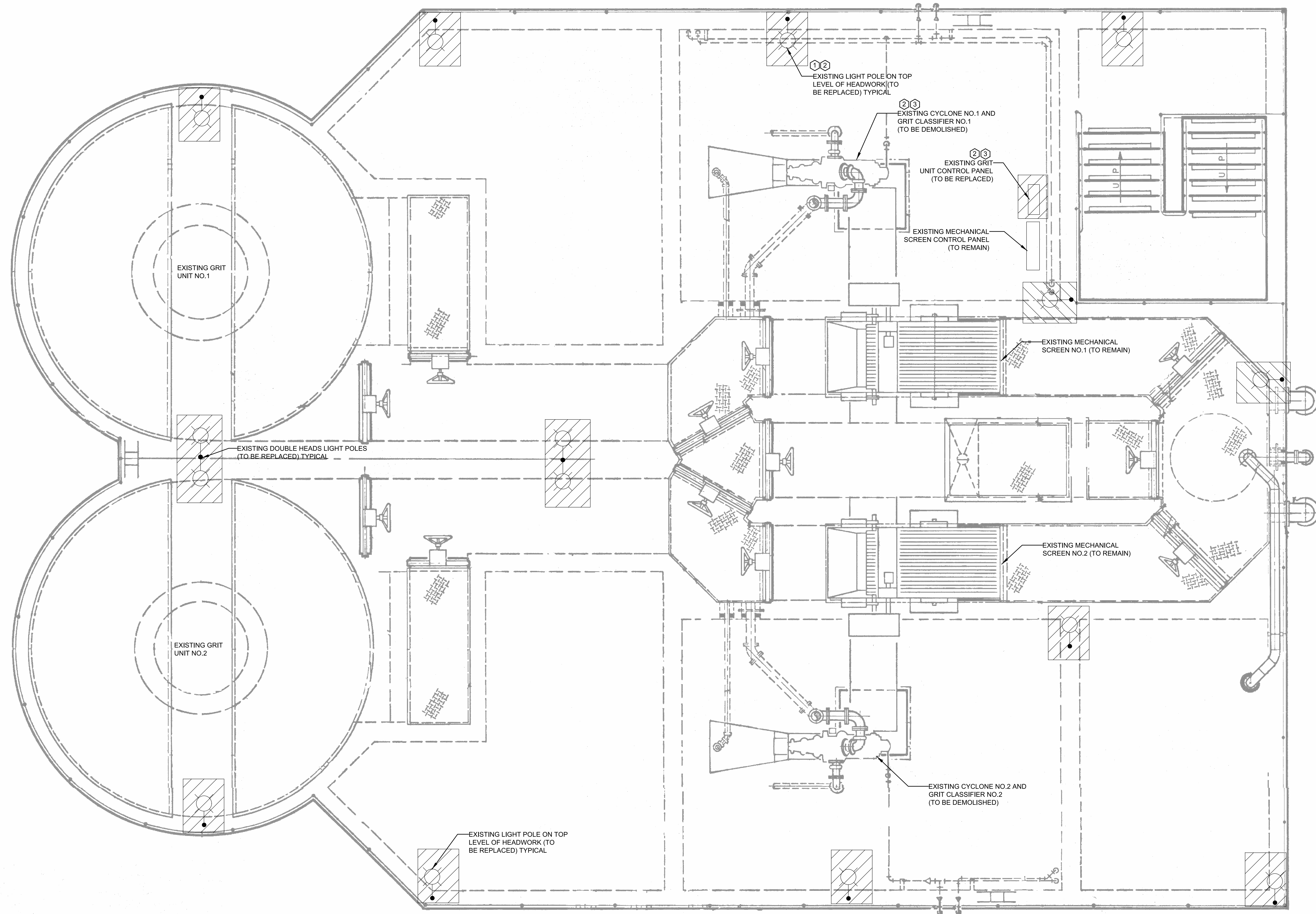
**HILLERS ELECTRICAL
ENGINEERING, INC.**
23257 STATE ROAD 7, SUITE 100
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THEIN WIN, P.E.
No. 65722



MANATEE COUNTY
SWWRF HEADWORKS REHABILITATION
ELECTRICAL
EXISTING MCC-HW1 ONE LINE - DEMOLITION

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 7880K10
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	DRAWING NO. E-4



KEY NOTES

- ① CONTRACTOR SHALL DEMOLISH THE EXISTING LIGHT POLES INCLUDING LIGHT FIXTURE AND ASSOCIATED CONDUITS/CABLES. FIELD IDENTIFY EXISTING CIRCUIT AND REUSE THE SAME CIRCUIT FOR NEW LIGHTS POLES. TURN OVER TO OWNER FOR ANY ITEMS REMOVED IF REQUESTED BY THE OWNER.
- ② FOR ALL DEMOLISHED ITEMS, REMOVE ALL EXPOSED CONDUITS BACK TO SOURCE. CUT ALL BURIED CONDUITS FLUSH WITH FLOOR OR WALL AND CAP. REMOVE ALL EXISTING WIRES BACK TO SOURCE.
- ③ COORDINATE AND ASSIST TO OTHER DISCIPLINES FOR DEMOLITION OF THE EXISTING GRIT CLASSIFIER AND CONVEYOR SYSTEM AND DISCONNECT POWER BEFORE DEMOLITION BEGINS.

HEADWORKS TOP LEVEL - ELECTRICAL DEMOLITION PLAN

SCALE: 3/8"=1'-0"

REV	DATE	BY	DESCRIPTION

DESIGNED TW
DRAWN DEU
CHECKED PFH
DATE SEPTEMBER 2012

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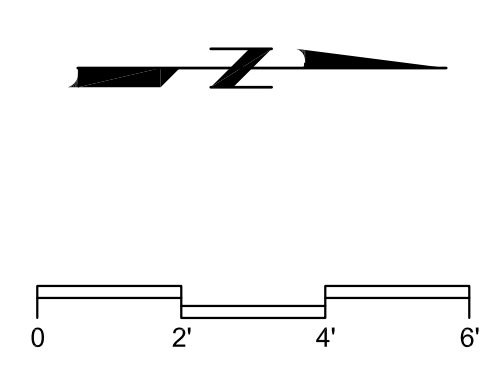
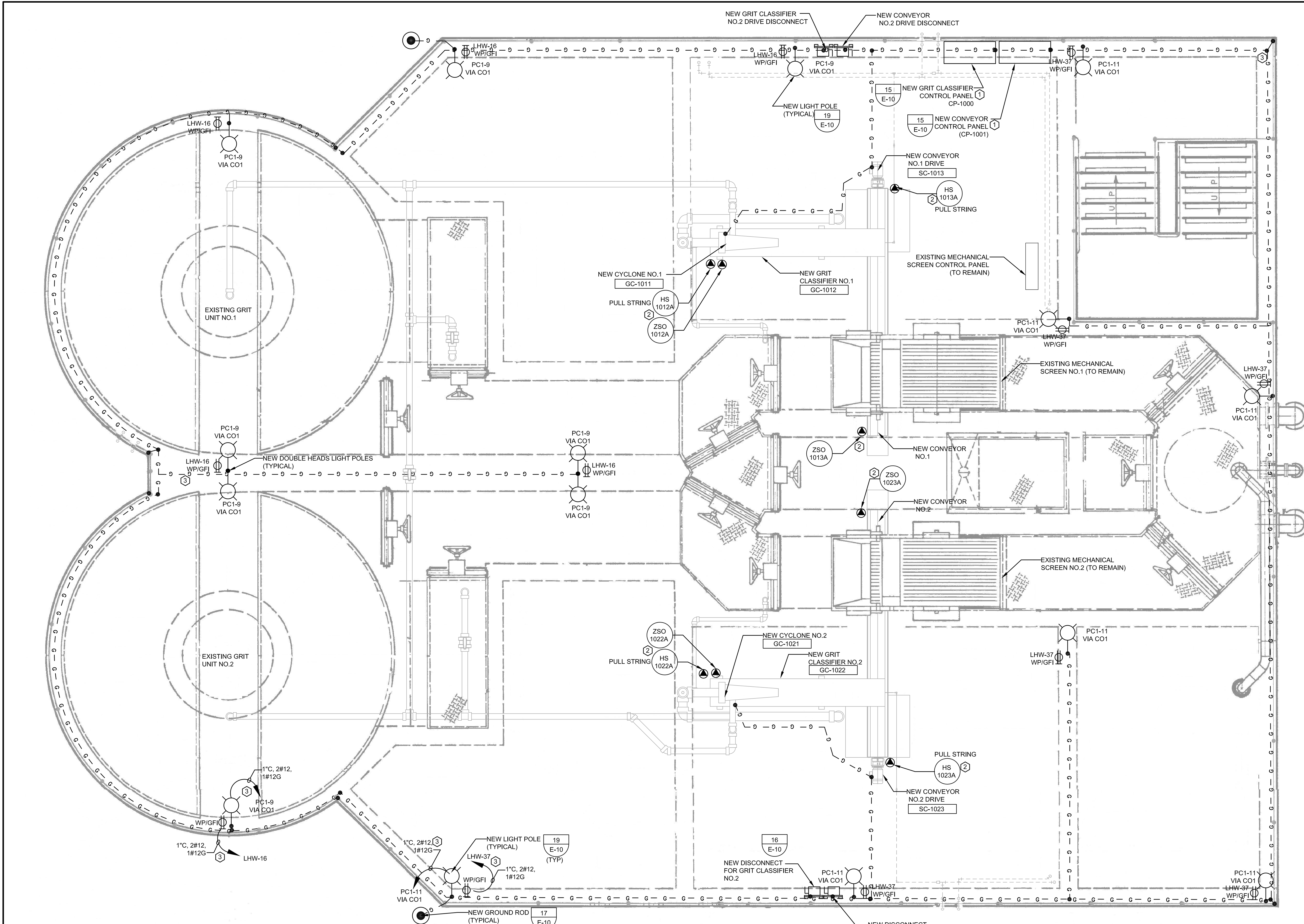
THEIN WIN, P.E.
 No. 65722



MANATEE COUNTY
 SWWRF HEADWORKS REHABILITATION
 ELECTRICAL
 HEADWORKS TOP LEVEL -
 ELECTRICAL DEMOLITION PLAN

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	JOB NO. 7880K10 DRAWING NO. E-5
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LAST SAVED BY: WTW



- KEY NOTES**
- FIELD LOCATE NEW GRIT CLASSIFIER CONTROL PANEL (CP-1000) AND CONVEYOR CONTROL PANEL (CP-1001) OUTSIDE THE CLASSIFIED AREA. MOUNT NEW PANELS NEAR HANDRAIL USING 316 STAINLESS STEEL UNISTRUT SUPPORTS. ADJUST LOCATION OF PANEL WITH EXISTING CONDITION TO AVOID CONFLICTS. PROVIDE 4 FEET CLEARANCE IN FRONT OF NEW GRIT CLASSIFIER CONTROL PANEL AND CONVEYOR CONTROL PANEL.
 - CONTRACTOR SHALL COORDINATE WITH GRIT CLASSIFIER AND CONVEYOR SUPPLIER FOR THE ACTUAL LOCATION OF THE EMERGENCY PULL STRING AND ZERO SPEED SWITCH LOCATION AND ADJUST ACCORDINGLY.
 - CONDUITS AND CABLES FOR HOME RUN CIRCUITS OF LIGHT POLE AND RECEPTACLE ARE ONLY SHOWN AT THE FIRST LIGHT POLE. CONTRACTOR SHALL PROVIDE CONDUIT AND CABLE TO ALL OTHER REMAINING LIGHT POLES AND RECEPTACLES.

- NOTES:**
- NFPA 820 CLASSIFIES THE 10 FEET ENVELOPE AROUND THE EQUIPMENT AND OPEN CHANNEL OF HEADWORKS WITH 18 INCHES ABOVE AS CLASS 1, DIVISION 2, GROUP D. ALL ELECTRICAL EQUIPMENT INSTALLATION PASSING THRU THIS ENVELOPE SHALL MEET NEC ARTICLE 501 REQUIREMENTS. ALL CONDUITS ENTERING OR LEAVING THIS AREA SHALL HAVE SEAL-OFF AS PER DETAIL ON DRAWING E-10.
 - BEFORE INSTALLATION, COORDINATE LOCATION OF EXPOSED CONDUIT ROUTING WITH ALL OTHER DISCIPLINES TO AVOID CONFLICTS.
 - CONTRACTOR SHALL PROVIDE AND INSTALL #4/0 AWG BARE TINNED COPPER GROUND WIRE ALL THE WAY AROUND TOP STRUCTURE OF THE HEADWORKS ALONG THE HANDRAILS. CLAMP GROUNDING CONDUCTOR AT EACH HANDRAIL. BOND GROUNDING CONDUCTORS TO ALL PANELS, LIGHT POLES, MOTORS, DISCONNECTS, STAIRWAYS, ETC. FOR A COMPLETE GROUNDING SYSTEM. PROVIDE AND INSTALL TWO GROUNDING DOWN WIRE (#4/0 AWG BARE TINNED COPPER) TO THE EXISTING GROUND GRID AT THE GROUND LEVEL OR INSTALL NEW GROUND RODS AT THE GROUND LEVEL. FIELD LOCATE EXISTING GROUND GRID.
 - EXPOSED CONDUIT AND EXPOSED GROUND WIRE INSTALLED ON TOP OF HEADWORK SHALL HAVE ALUMINUM RAMP COVER FOR WALKING AREAS TO AVOID TRIPPING HAZARD. SECURELY ATTACH THE ALUMINUM RAMP TO THE CONCRETE SLAB USING 316 STAINLESS STEEL NUTS AND BOLTS.
 - PROVIDE UNISTRUT OR BACK AND STRAP FOR RIGID ALUMINUM CONDUIT TO BE INSTALLED ON CONCRETE WALL OR SURFACE. RIGID ALUMINUM CONDUIT SHALL NOT BE INSTALLED DIRECT CONTACT WITH CONCRETE.
 - ROUTE EXPOSED CONDUITS ALONG HANDRAIL WHEREVER POSSIBLE.

HEADWORKS TOP LEVEL - ELECTRICAL PLAN
SCALE: 3/8"=1'-0"

DESIGNED	TW
DRAWN	DEU
CHECKED	PFH
DATE	SEPTEMBER 2012
REV	DATE BY DESCRIPTION

THEIN WIN, P.E.
No. 65722

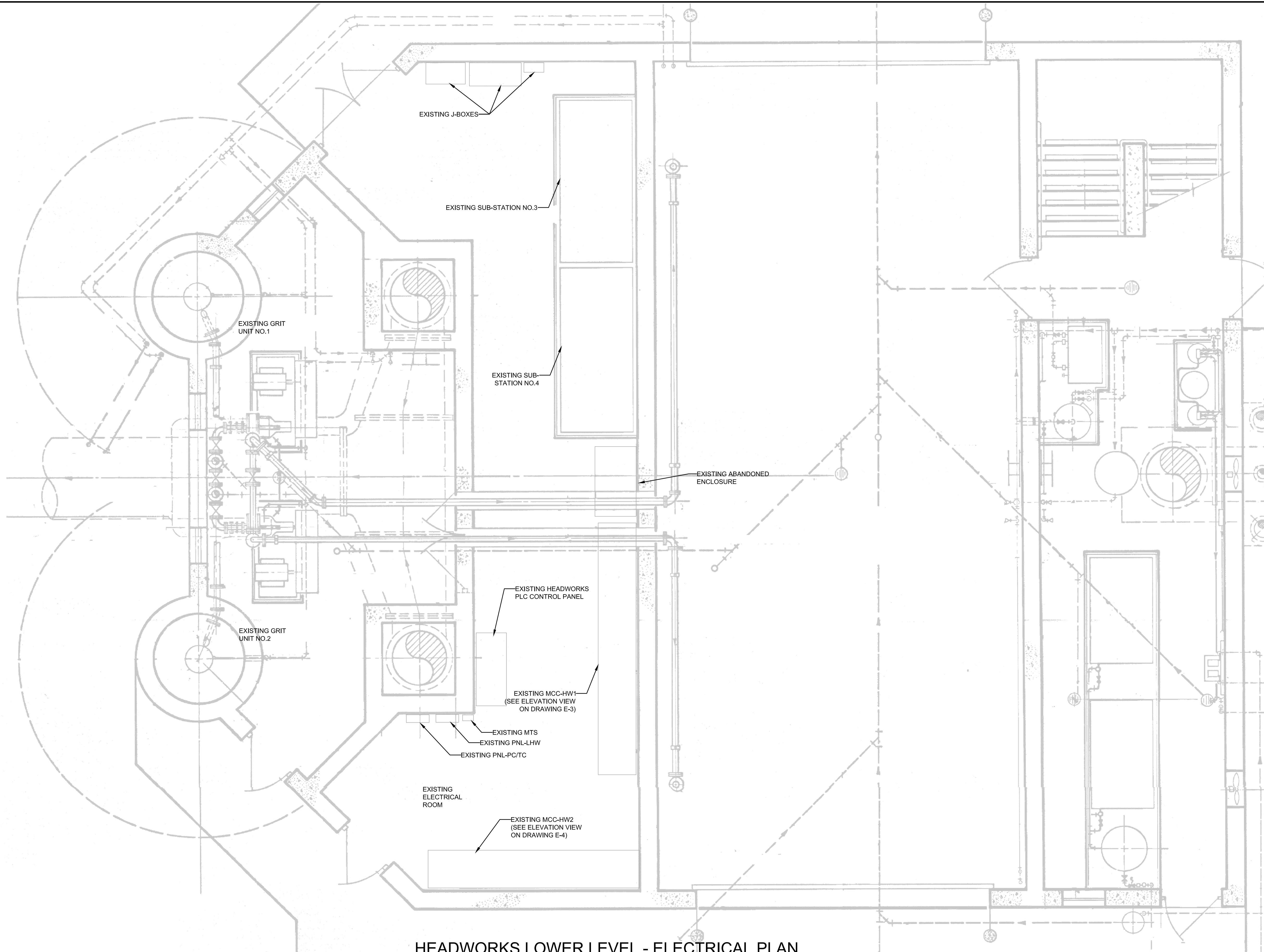
HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877



MANATEE COUNTY
SWWRF HEADWORKS REHABILITATION
ELECTRICAL
HEADWORKS TOP LEVEL - ELECTRICAL PLAN

VERIFY SCALES	JOB NO. 7880K10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. E-6
0 1"	
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	

LAST SAVED BY: twm



NOTE:
 1. PROVIDE AND INSTALL EXPOSED CONDUITS FROM EXISTING MCC-HW1, MCC-HW2, AND PLC CONTROL PANEL TO TOP LEVEL OF HEADWORKS AS SHOWN ON OTHER DRAWINGS, SUCH AS ONE LINE DIAGRAM, PLAN VIEW, RISER DIAGRAM, ETC. SUPPORT EXPOSED CONDUITS AS PER SPECIFICATION 16110 AND FIELD ADJUST CONDUIT ROUTING AND PENETRATIONS WITH EXISTING CONDITION TO AVOID CONFLICTS.

HEADWORKS LOWER LEVEL - ELECTRICAL PLAN

SCALE: 3/8"=1'-0"

DESIGNED	TW
DRAWN	DEU
CHECKED	PFH
DATE	SEPTEMBER 2012
REV	DATE BY DESCRIPTION

THEIN WIN, P.E.
 No. 65722

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MANATEE COUNTY
 SWWRF HEADWORKS REHABILITATION
 ELECTRICAL
 HEADWORKS LOWER LEVEL - ELECTRICAL PLAN

VERIFY SCALES
 BAR IS ONE INCH ON ORIGINAL DRAWING
 0 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 7880K10
 DRAWING NO. E-7

LAST SAVED BY: WTW

EXISTING PNL. PC/TC SCHEDULE

BUS AMPS			LOAD	POLES	AMPS	BUS			AMPS	POLES	LOAD	BUS AMPS		
A	B	C				A	B	C				A	B	C
			TC	3	100	1	2	3	60	1	PC			
			CONTROL	1	20	7	8	20	20	1	EME. SHOWER & RECP. POLES AER. TANK			
			RECP. FINAL CLARIFIER #3, #4	1	20	9	10	20	20	1	STR. POLES & CENTER POLES AER. TANK			
			RECP. PRIMARY CLARIFIER WEST	1	20	11	12	20	20	1	RECEP. POLES WEST AERATION TANK			
			10' POLES HEADWORKS SAMPLER RECP.	1	20	13	14	20	20	1	RECEP. PRIMARY CLARIFIER EAST			
			SPARE	1	20	15	16	20	20	1	RECEP. LIGHT POLES			
			STAIRWELL LIGHTS HEADWORKS	1	20	17	18	20	20	1	RECEP. LIGHT POLES			
			SPACE	-	-	19	20	-	-	-	SPACE			
			SPACE	-	-	21	22	-	-	-	SPACE			
			SPACE	-	-	23	24	-	-	-	SPACE			
			STREET POLES PRIMARY CLARIFIER WEST	1	20	1	2	20	20	1	STREET POLES PRIMARY CLARIFIER EAST			
			10' POLES CENTER AERATION TANK	1	20	3	4	20	20	1	20' POLES AERATION TANK			
			10' POLES FINAL CLARIFIER #3, #4	1	20	5	6	20	20	1	10' POLES FINAL CLARIFIER SOUTH			
			10' PO. AER. TANK EAST, 10' PO. PRIM. CLAR. WEST	1	20	7	8	20	20	1	10' POLES PRIMARY CLARIFIER WEST			
			10' PO. & OUTSIDE LIGHTS ON HEADWORKS EAST	1	20	9	10	20	20	1	10' POLES PRIMARY CLARIFIER NORTH			
			10' PO. & OUTSIDE LIGHTS ON HEADWORKS WEST	1	20	11	12	20	20	1	10' POLES AERATION WEST AERATION WEST			
			SPACE	-	-	13	14	-	-	-	SPACE			
			SPACE	-	-	15	16	-	-	-	SPACE			
			SPACE	-	-	17	18	-	-	-	SPACE			
			USED	1	20	1	2	20	20	1	USED			
			USED	1	20	3	4	20	20	1	USED			
			USED	1	20	5	6	20	20	1	USED			
			USED	1	20	7	8	20	20	1	USED			
			USED	1	20	9	10	20	20	1	USED			
			USED	1	20	11	12	20	20	1	USED			

THE LIGHT POLES ARE ONE TO ONE REPLACEMENT AND NO ADDITIONAL LOAD IS ADDED TO THIS PANEL.

NOTES:

- EXISTING PANEL SHCHEDULE IS OBTAINED FORM AS-BUILT DRAWINGS. NEITHER OWNER NOR ENGINEER HAS VERIFY THE INFORMATION FOR CORRECTNESS. CONTRACTOR SHALL FIELD VERIFY THE ACCURACY OF THE INFORMATION AND ADJUST AS NEEDED WITHOUT ADDITIONAL COST TO THE OWNER.
- AFTER REMOVAL OF EXISTING LIGHT POLES, RE-WIRE THE EXISTING HEADWORKS WALL MOUNTED LIGHT AS NEEDED FOR A COMPLETE AND FUNCTIONAL LIGHTING SYSTEM. PROVIDE AND INSTALL NEW CONDUITS AND CABLES AS NEEDED.

EXISTING PNL. LHW SCHEDULE

BUS AMPS			LOAD	POLES	AMPS	BUS			AMPS	POLES	LOAD	BUS AMPS		
A	B	C				A	B	C				A	B	C
2.1			LIGHTING IN COMP ROOM	1	20	1	2	20	6.0	1	LIGHTS ELECTRICAL ROOM	6.0		
	1.0		DUCKING SKIMMER #3, #4	1	20	3	4	20	2.0	1	FIT426,FIT460,FIN. CLAR.#3 RAS&WAS MET.		2.0	
		0.5	LIGHT AT PRIMARY SLUDGE PUMP FIT 250	1	20	5	6	20		1	T.V.			2.0
1.0			PH BLK PROBE, FIT #100	1	20	7	8	20	1.5	1	EME. SHOWER & RECP. POLES AER. TANK	1.5		
		0.5	DIGESTER DRAIN	1	20	9	10	20	6.5	1	LIGHTS RAS PUMP #4 & #6		6.5	
		0.5	PLANT DRAIN	1	20	11	12	20	3.0	1	LIGHTING PRIMARY SCUM EJECTER		3.0	
1.0			FIT 470	1	20	13	14	20	6.0	1	SAMPLER, RECEP.TS, SOUTH WALL INFL. ROOM	6.0		
		0.5	1,2,3,4 CLARIFIER BLANKET DETECTOR CONTROL	1	20	15	16	20	9.0	1	RECEP. ON LIGHT POLES (HEADWO)	9.0		
		1.0	RAS METER	1	20	17	18	20		1	SPARE		-	
5.2			LIGHTS DRIVE THROUGH	1	20	19	20	20	9.0	1	RECEP. ELECTRICAL ROOM	9.0		
		1.0	EMERGENCY LIGHT ELECTRICAL ROOM	1	20	21	22	20	10.5	1	LIGHTS PUMP ROOM	10.5		
		3.0	RECEP."XX" CONTROL PANEL	1	20	23	24	100	25.3	3	FEED FOR PC/TC PANEL OUTSIDE STR. LIGHT	25.3		
		6.5	LIGHTS RAS PUMPS #1, #2	1	20	25	26	20	20.5	1		20.5		
		1.0	FIT 450	1	20	27	28	20	18.8	1		18.8		
		1.0	DUCKING SKIMMER #1, #2	1	20	29	30	20	3.0	2	MAIN GATE, MAIN CAMERA	3.0	3.0	
X			SPACE	1	20	31	32	20				3.0		
		0.5	EMER. HW BYPASS VALVE	1	20	33	34	20	10.2	2	AC COMP	10.2		
		2.0	SCADA PANEL 4	1	20	35	36	20	10.2	1		10.2		
		7.5	RECEP. ON LIGHT POLES (HEADWORKS)	1	20	37	38	20	1.0	1	USED	1.0		
		10.2	AC COMP 1	2	20	39	40	20	0.5	1	USED	0.5		
		10.2		1	20	41	42	20	3.0	1	USED	3.0		

TOTAL AMPS: BUS A, 70.3 BUS B, 72.2 BUS C, 64.7 CONNECTED Kva, 24.8

RATED VOLTAGE: 120/208 277/480 3 PHASE, 4 WIRE BRANCH POLES 12 20 24 42

RATED AMPS: 100 225 400 CABINET: SURFACE FLUSH

NEUTRAL BUS 100% 150% 200% GROUND BUS HINGED DOOR KEYED DOOR LATCH LOCATION:

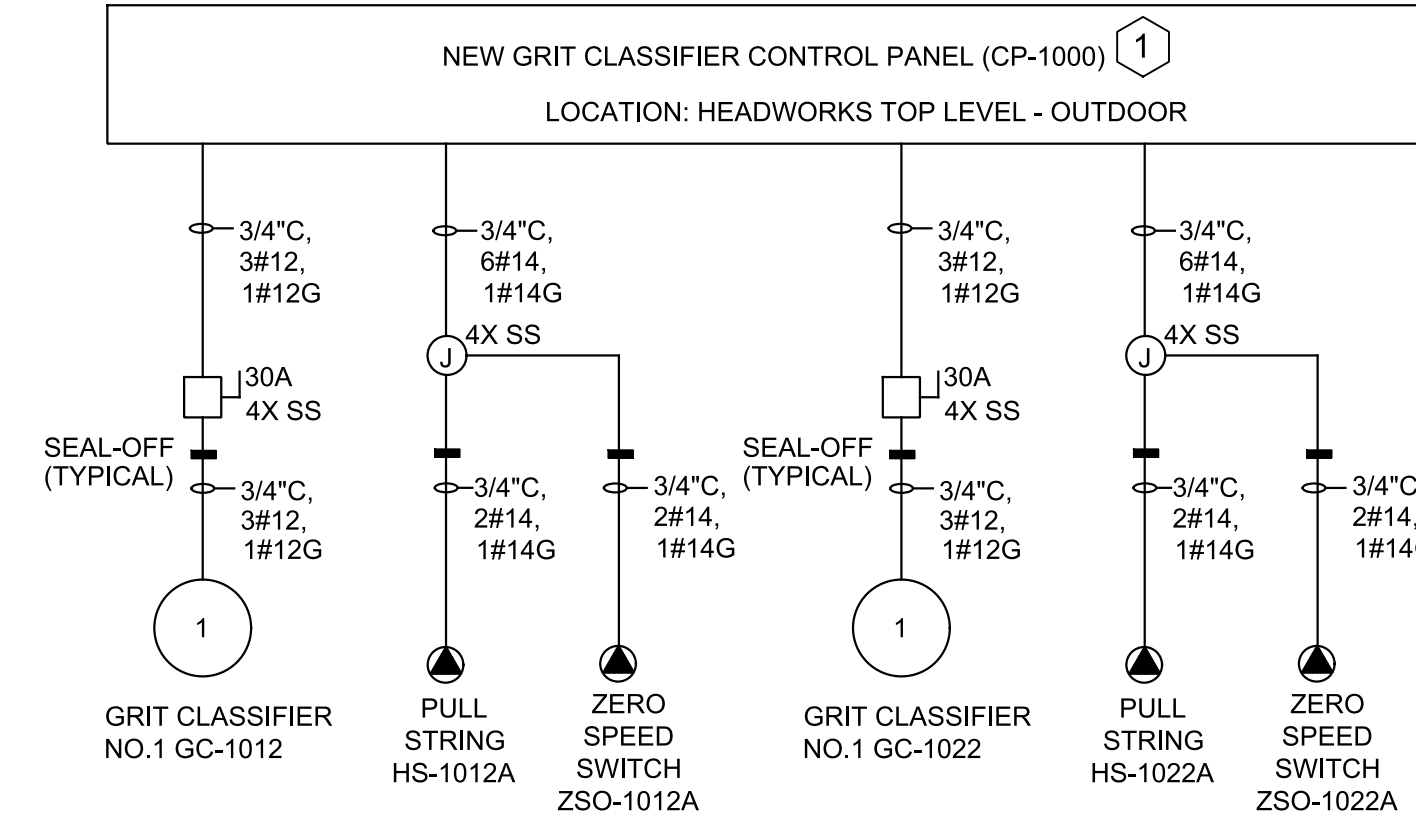
CIRCUIT BREAKER (BOLT-IN) BRANCH DEVICES TVSS ENCLOSURE TYPE NEMA 1 NEMA 3R NEMA 4X

MAIN LUGS ONLY MAIN 100 AMP BREAKER TO BE GFI BREAKERS

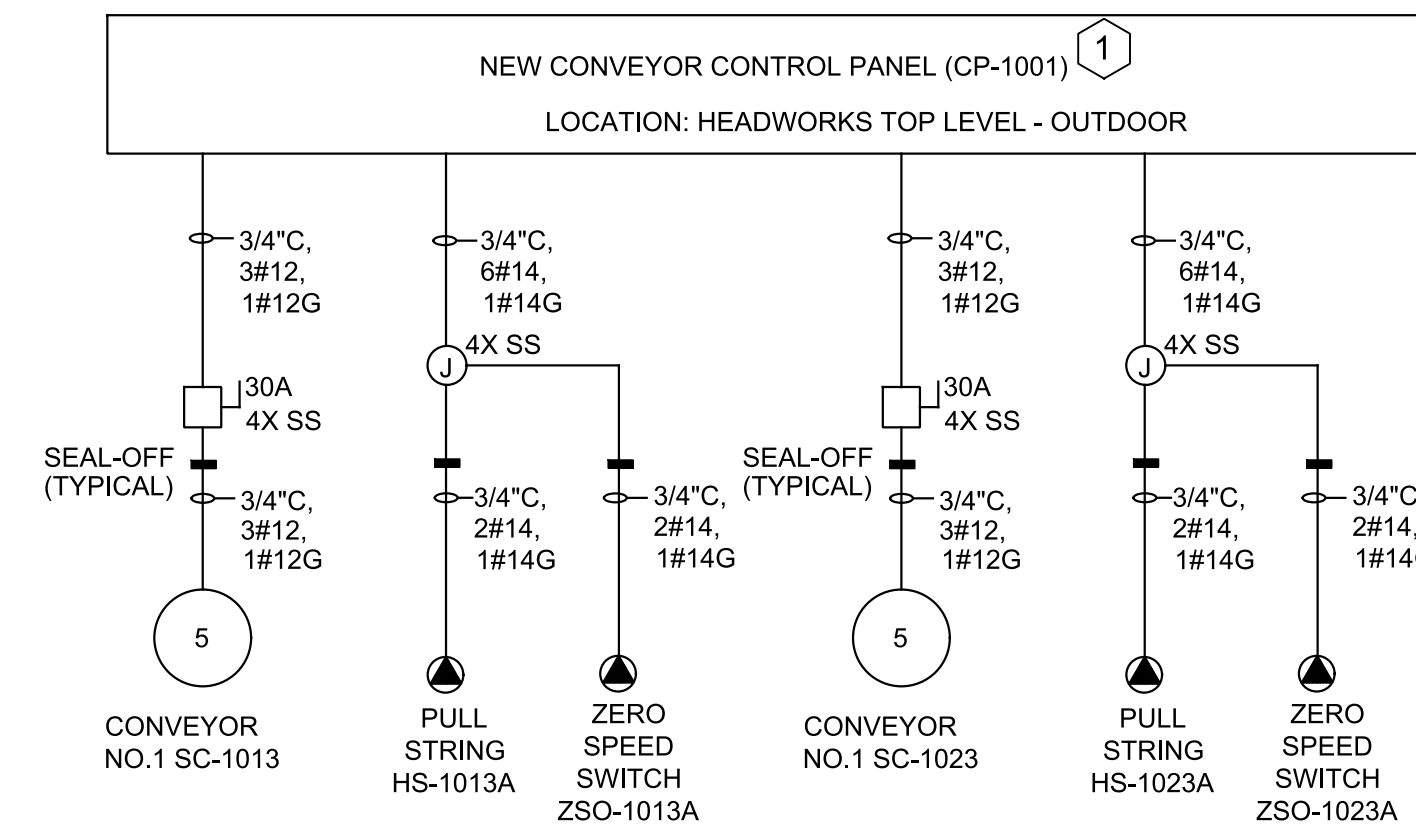
PANELBOARD MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL.

MFRS. SQUARE D COPPER BUSSES MAIN LUGS SETS SIZE:

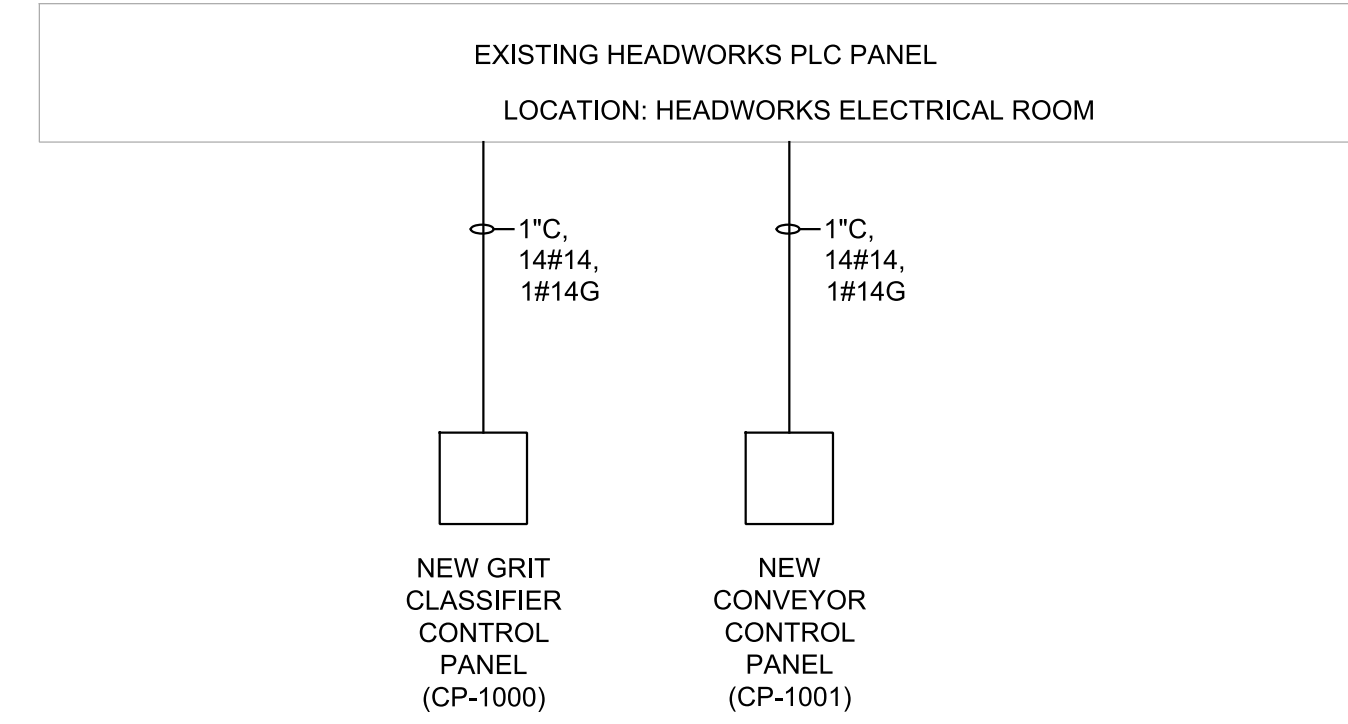
PROVIDE AND INSTALL 20A-1P BREAKER . MATCH STYLE AND AIC RATING WITH EXISTING.



GRIT CLASSIFIER CONTROL PANEL CP-1000 RISER DIAGRAM
NOT TO SCALE



CONVEYOR CONTROL PANEL CP-1001 RISER DIAGRAM
NOT TO SCALE



EXISTING HEADWORKS PLC PANEL RISER DIAGRAM
NOT TO SCALE

INPUT/OUTPUT (I/O) SCHEDULE

- USE THE FOLLOWING I/O POINTS AT EXISTING HEADWORKS PLC FOR NEW SIGNALS.
- CONVEYOR NO.1 RUNNING (QI-1013A) = RACK 1, SLOT 5, INPUT 0
 - CONVEYOR NO.1 FAIL (QA-1013B) = RACK 1, SLOT 5, INPUT 1
 - CONVEYOR NO.2 RUNNING (QI-1023A) = RACK 1, SLOT 5, INPUT 2
 - CONVEYOR NO.2 FAIL (QA-1023B) = RACK 1, SLOT 5, INPUT 3
 - GRIT CLASSIFIER NO.1 IN REMOTE (QI-1012B) = RACK 1, SLOT 5, INPUT 4
 - GRIT CLASSIFIER NO.1 RUNNING (QI-1012A) = RACK 1, SLOT 5, INPUT 5
 - GRIT CLASSIFIER NO.1 FAIL (QA-1012B) = RACK 1, SLOT 5, INPUT 6
 - GRIT CLASSIFIER NO.2 IN REMOTE (QI-1022B) = RACK 1, SLOT 5, INPUT 7
 - GRIT CLASSIFIER NO.2 RUNNING (QI-1022A) = RACK 1, SLOT 5, INPUT 8
 - GRIT CLASSIFIER NO.2 FAIL (QA-1022B) = RACK 1, SLOT 5, INPUT 9
 - GRIT CLASSIFIER NO.1 START/STOP (HK-1012A) = RACK 1, SLOT 10, OUTPUT 11
 - GRIT CLASSIFIER NO.1 START/STOP (HK-1012A) = RACK 1, SLOT 10, OUTPUT 12

LAST SAVED BY: WTW

REV	DATE	BY	DESCRIPTION

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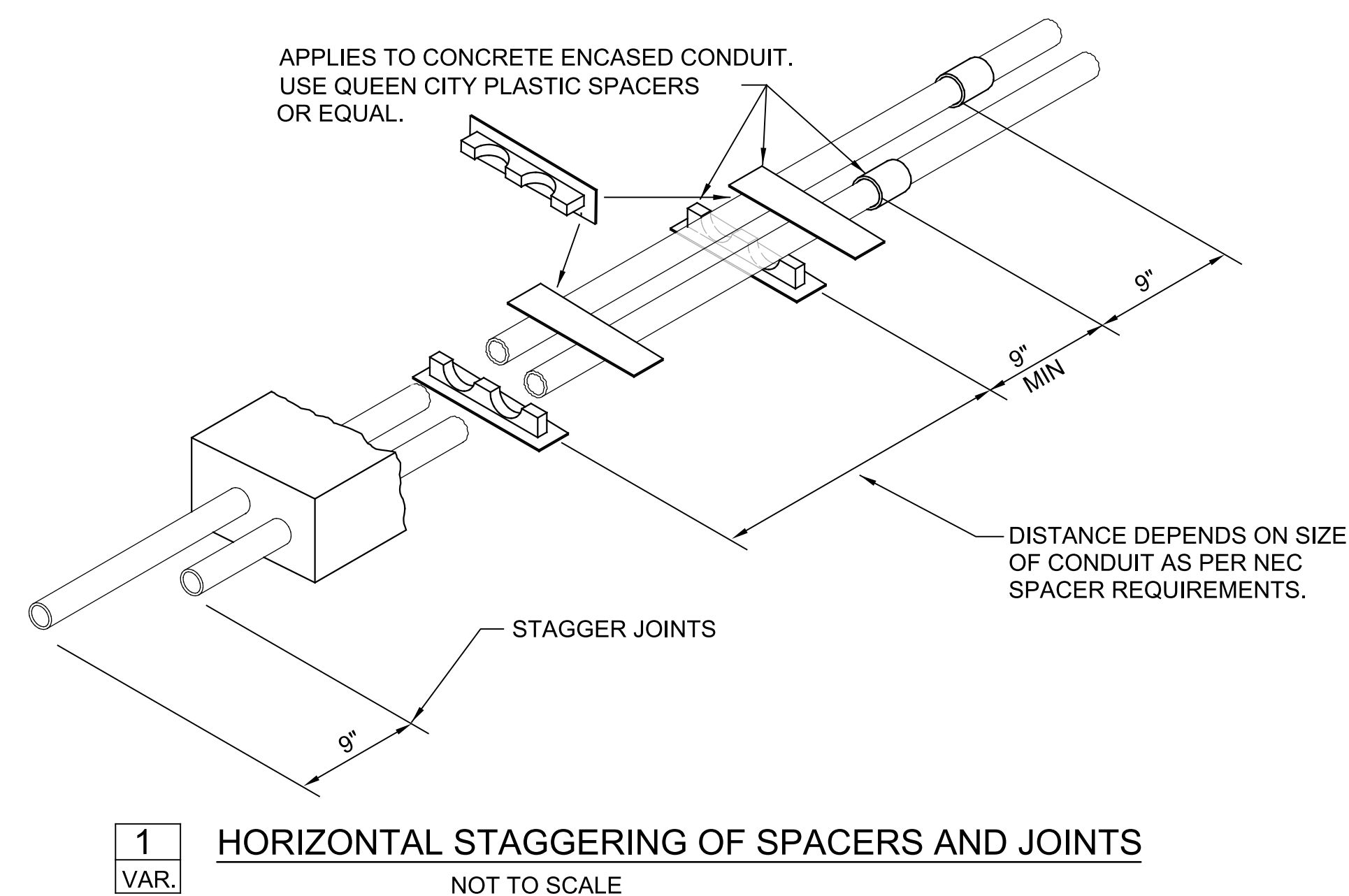
HILLERS ELECTRICAL ENGINEERING, INC.
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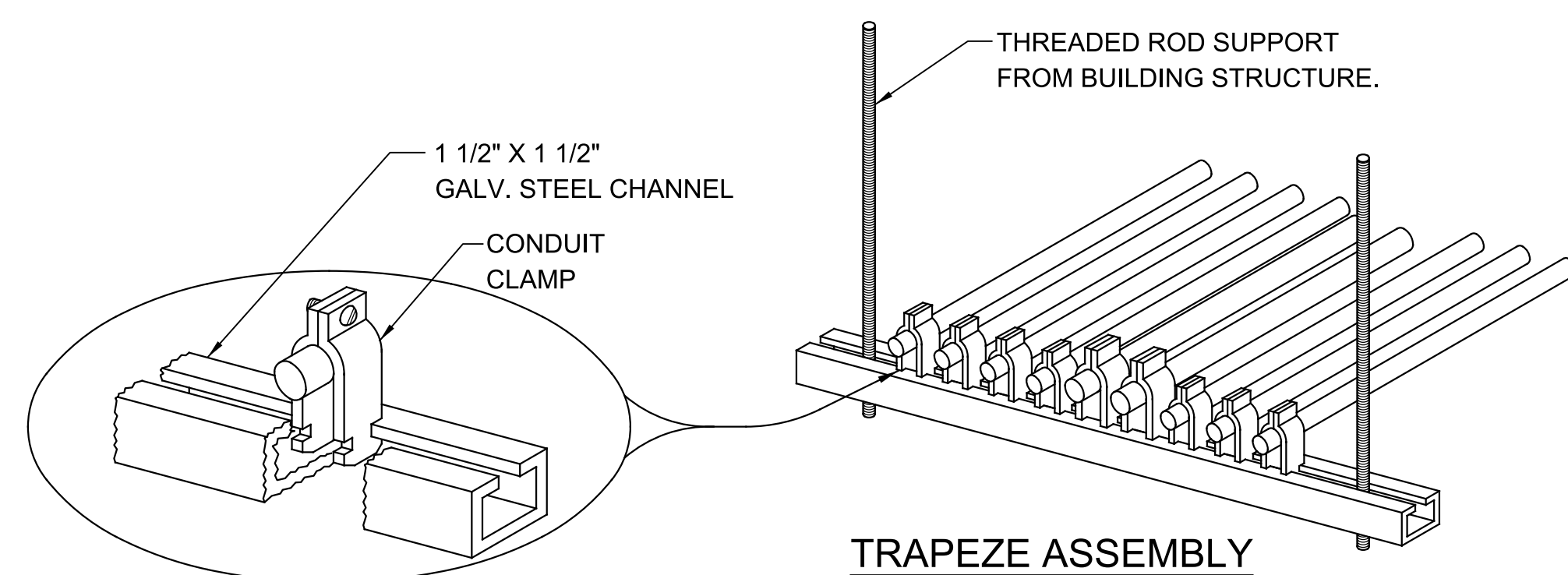
MANATEE COUNTY
SWWRF HEADWORKS REHABILITATION
ELECTRICAL SCHEDULES

VERIFY SCALES
JOB NO. 7880K10
DRAWING NO. E-8
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY



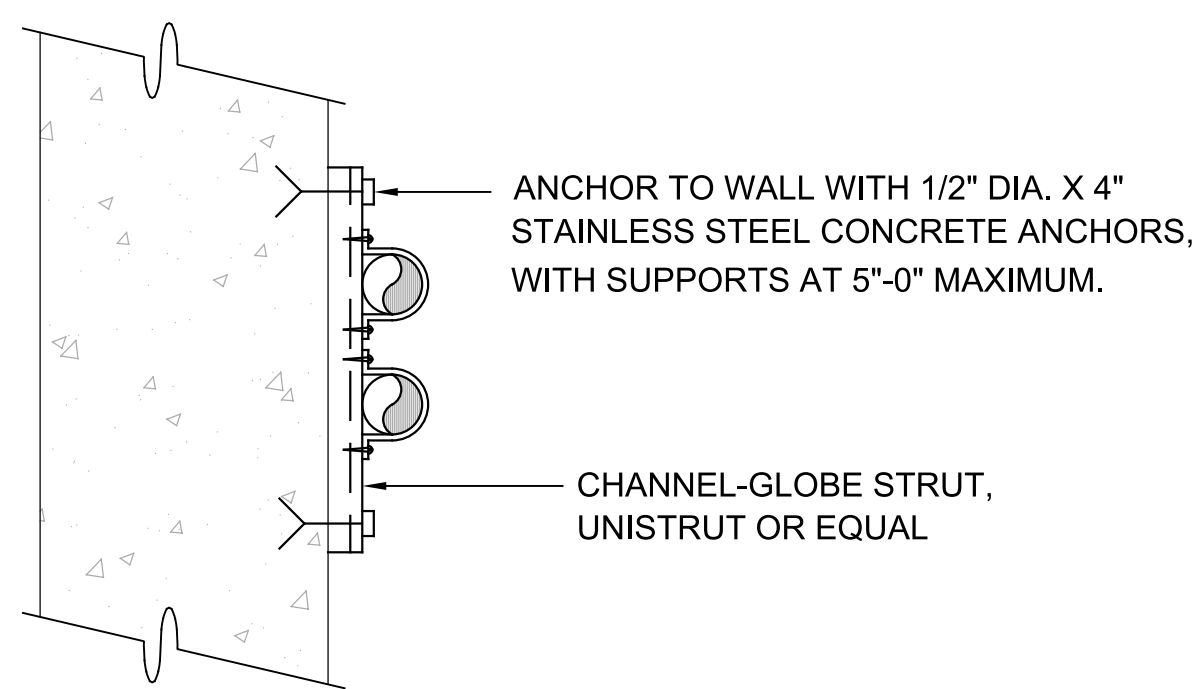
1 HORIZONTAL STAGGERING OF SPACERS AND JOINTS
VAR. NOT TO SCALE

- NOTES:**
1. THIS DETAIL TYPICAL FOR BOTH VERTICAL AND HORIZONTAL MOUNTING
 2. CHANNEL AND ALL SUPPORT DEVICES TO BE HOT DIP GALVANIZED STEEL. FIELD COAT ALL CUTS, ETC. TO MATCH.
 3. CHANNELS TO BE SPACED 5' MAXIMUM.

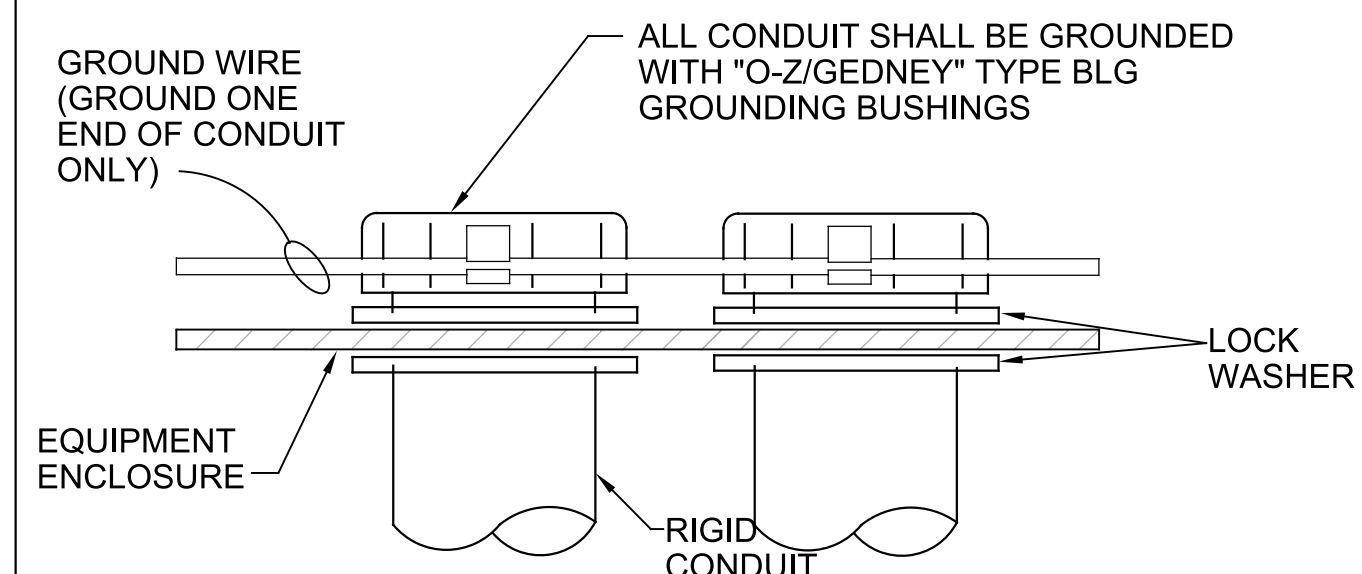


CONDUIT PIPE STRAP MOUNTING DETAILS

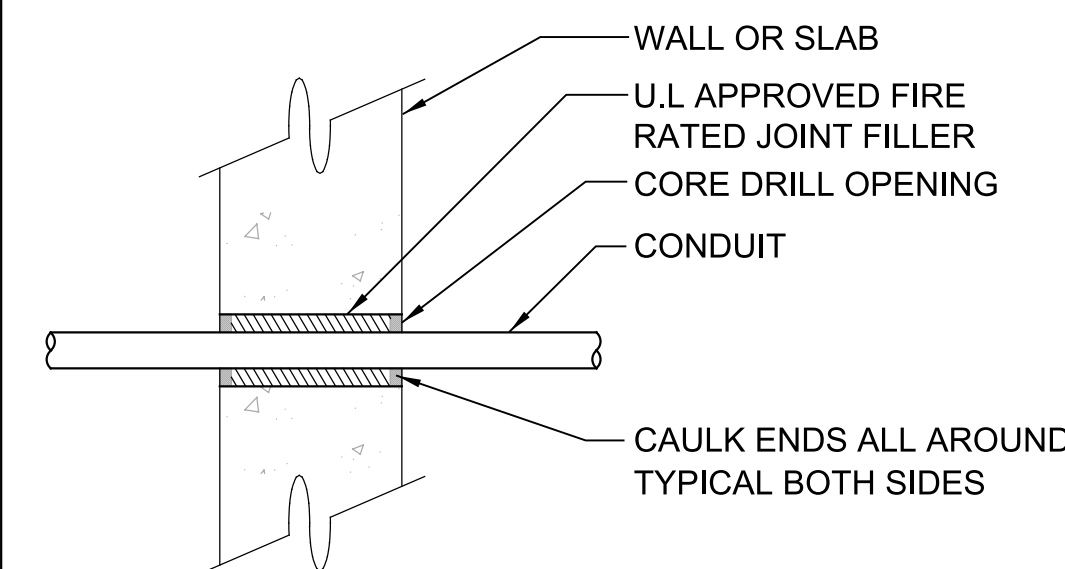
5 CONDUIT SUPPORT
VAR. NOT TO SCALE



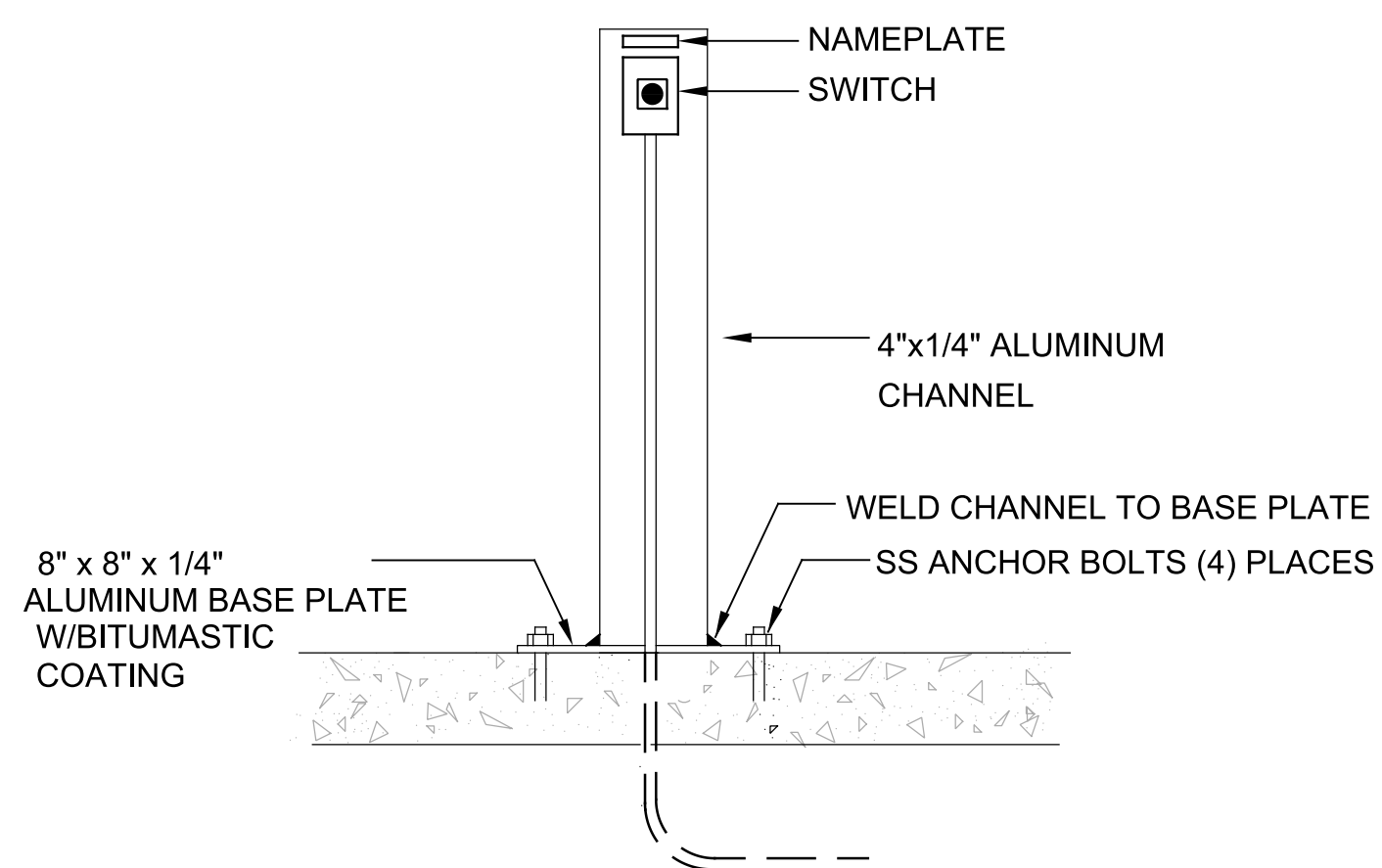
2 CONDUIT SUPPORT
VAR. NOT TO SCALE



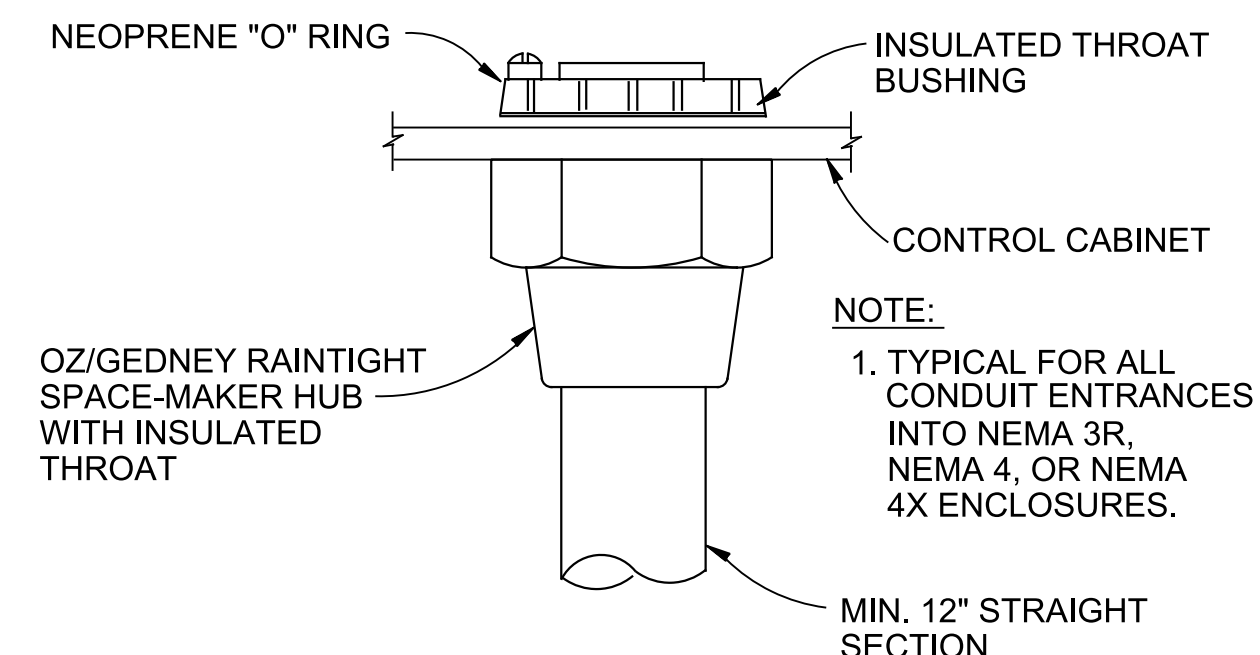
3 CONDUIT GROUNDING
VAR. NOT TO SCALE



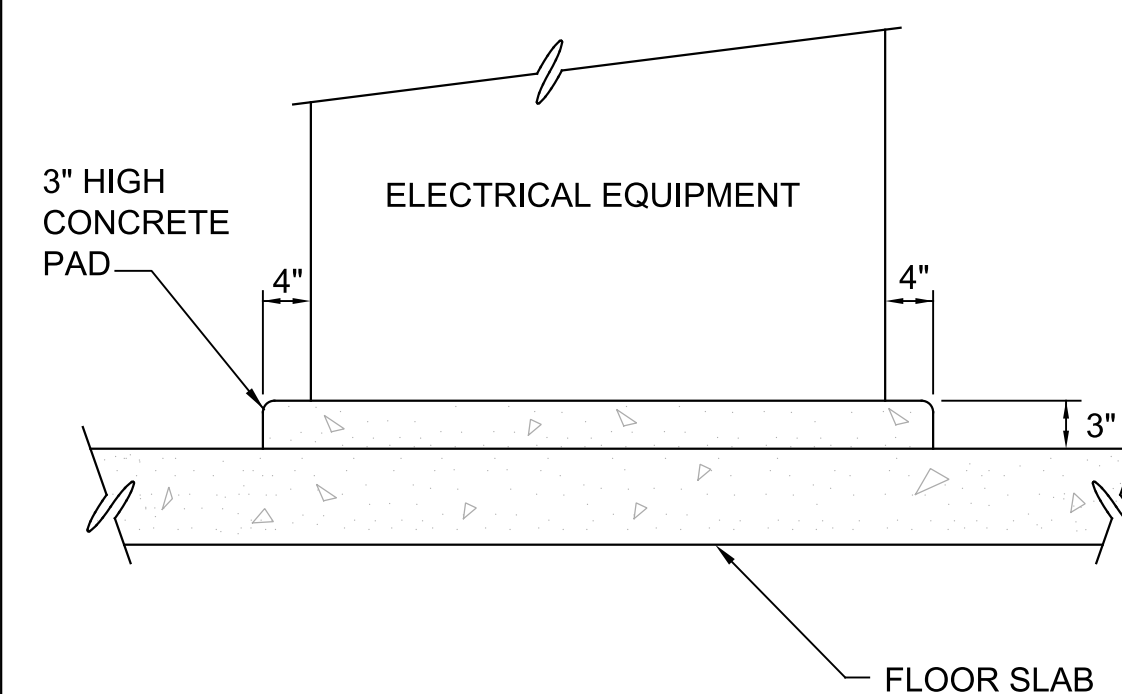
4 CONDUIT PENETRATION AT WALL OR SLAB
VAR. NOT TO SCALE



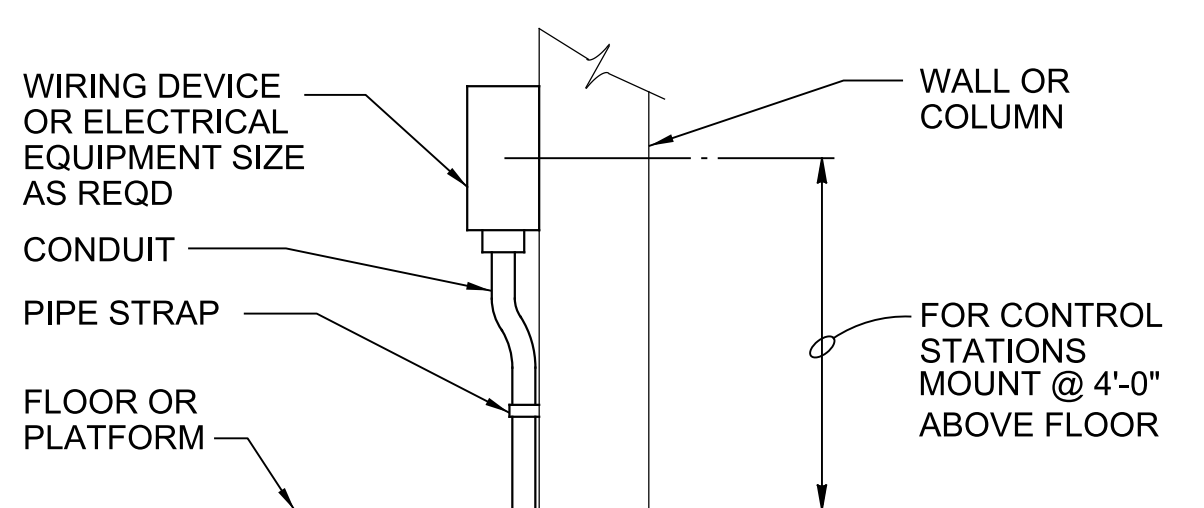
6 SWITCH PEDESTAL
VAR. NOT TO SCALE



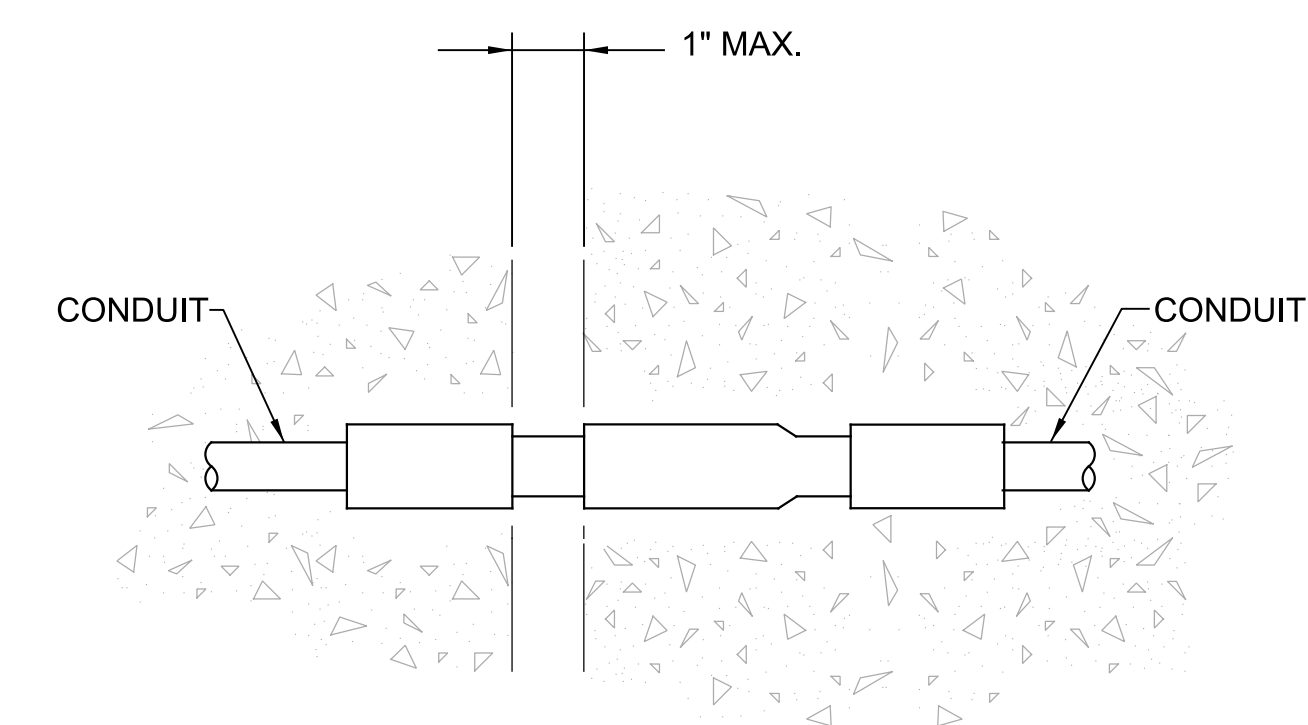
7 CONDUIT HUB
VAR. NOT TO SCALE



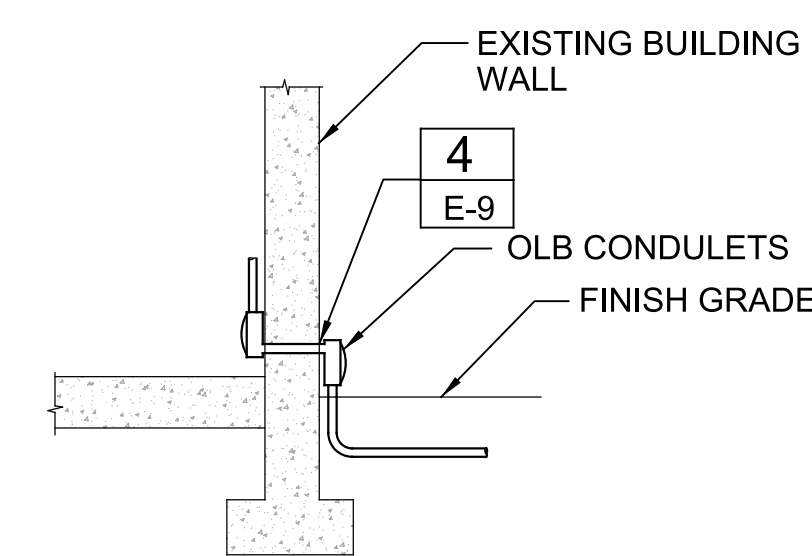
8 EQUIPMENT HOUSE KEEPING PAD
VAR. NOT TO SCALE



9 WALL OR COLUMN MOUNTED DEVICE
VAR. NOT TO SCALE



10 EXPANSION COUPLING
VAR. NOT TO SCALE



11 CONDUIT ENTRANCE
VAR. NOT TO SCALE

LAST SAVED BY: WTW

REV	DATE	BY	DESCRIPTION

DESIGNED	TW
DRAWN	DEU
CHECKED	PFH
DATE	SEPTEMBER 2012

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9185
(561) 451-4886 FAX
LICENSE NO: EB 0006877

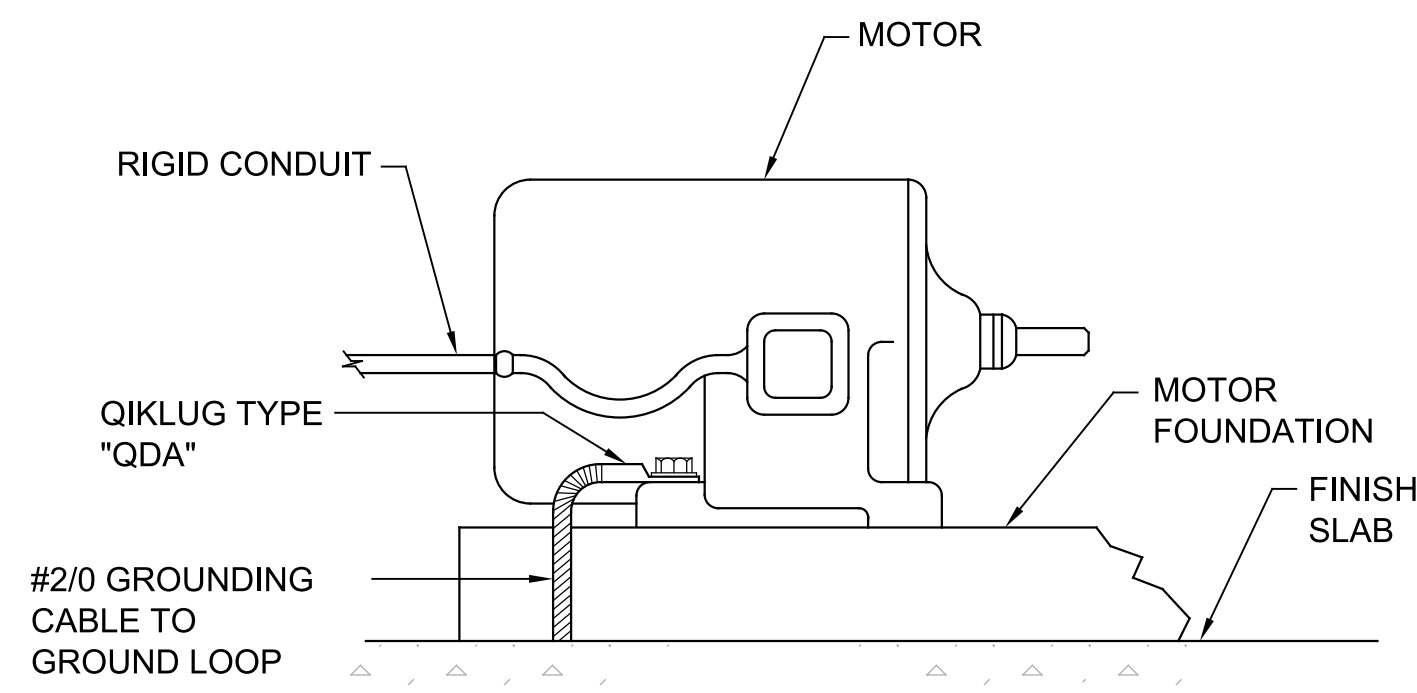
THEIN WIN, P.E.
No. 65722



MANATEE COUNTY
SWWRF HEADWORKS REHABILITATION
ELECTRICAL
ELECTRICAL DETAILS - SHEET 1

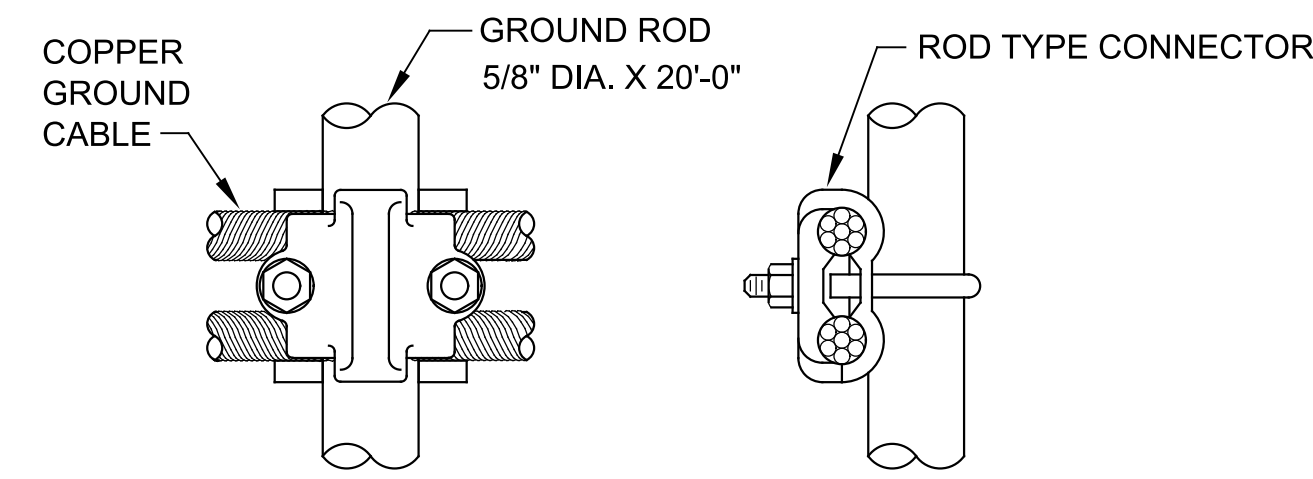
VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 7880K10
DRAWING NO. E-9

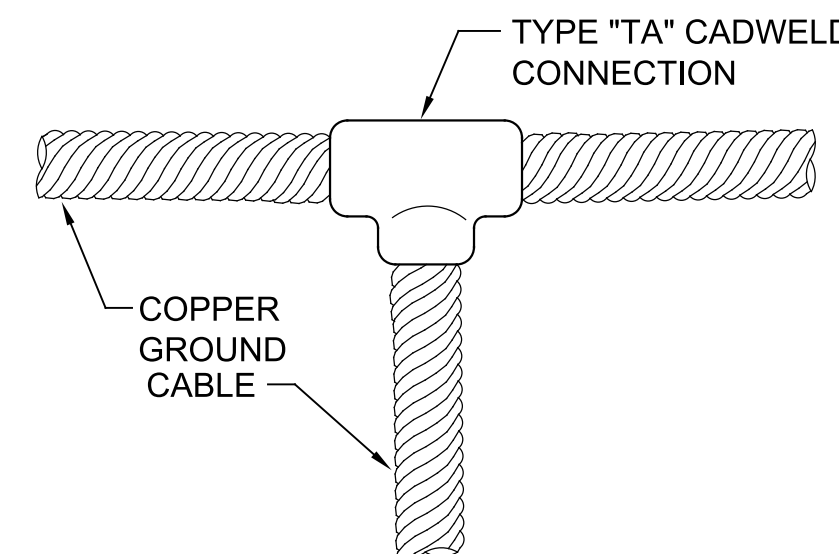


NOTE:
THIS GROUND IS IN ADDITION TO THE GROUND FROM THE MAIN ELECTRICAL SERVICE.

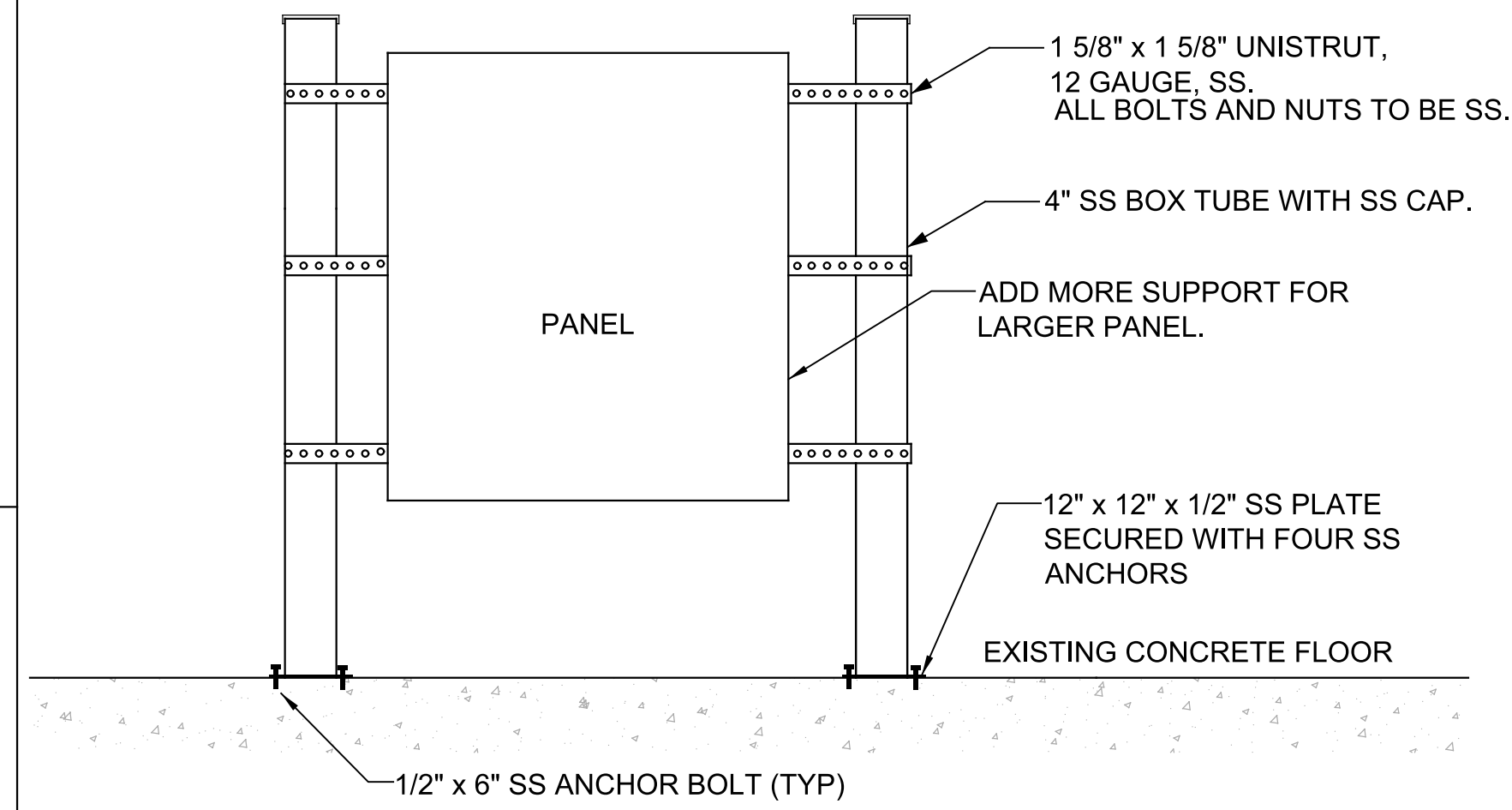
12 VAR. EQUIPMENT GROUNDING DETAIL (TYPICAL) NOT TO SCALE



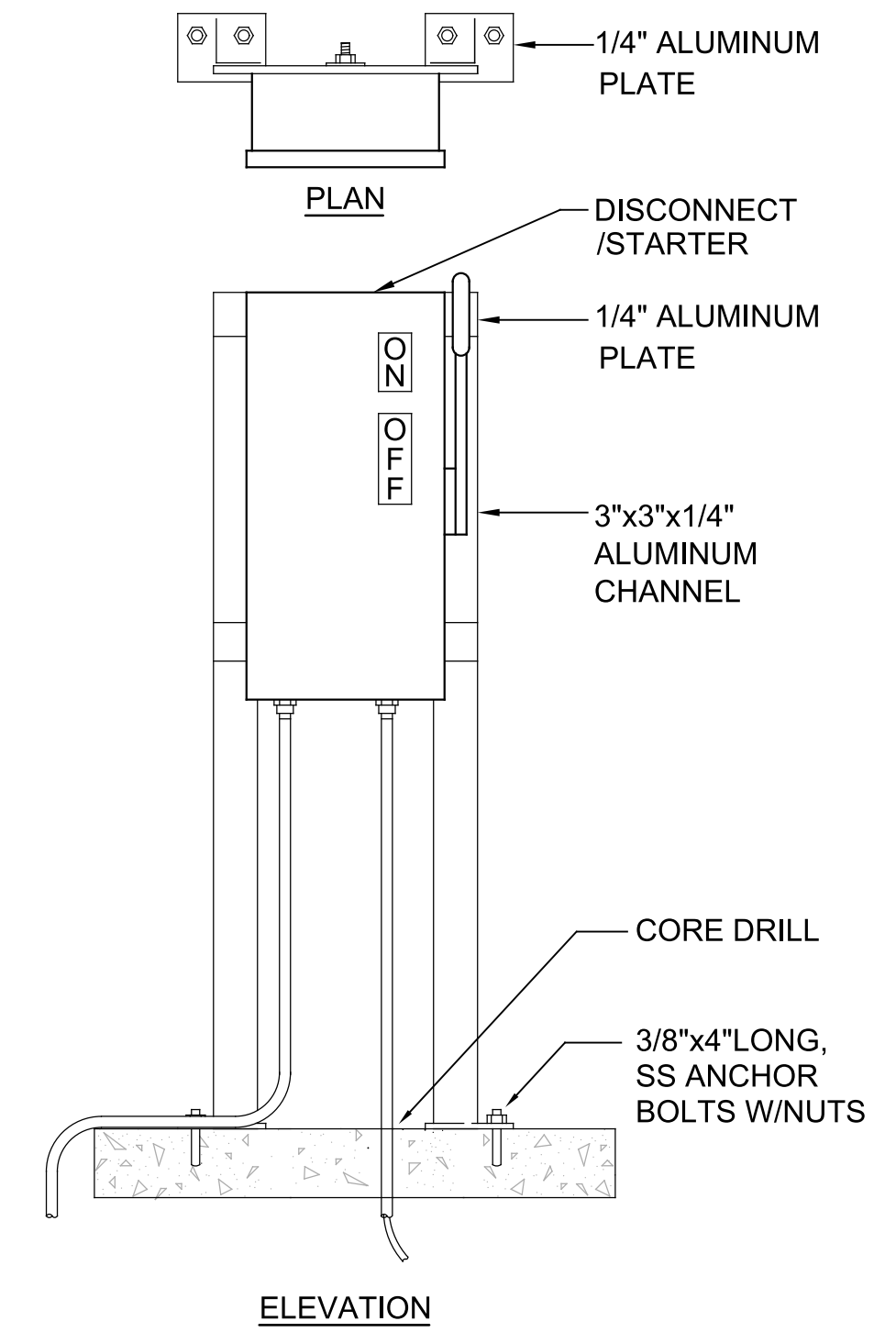
13 VAR. CABLE TO ROD CONNECTION NOT TO SCALE



14 VAR. GROUND CABLE CONNECTION NOT TO SCALE

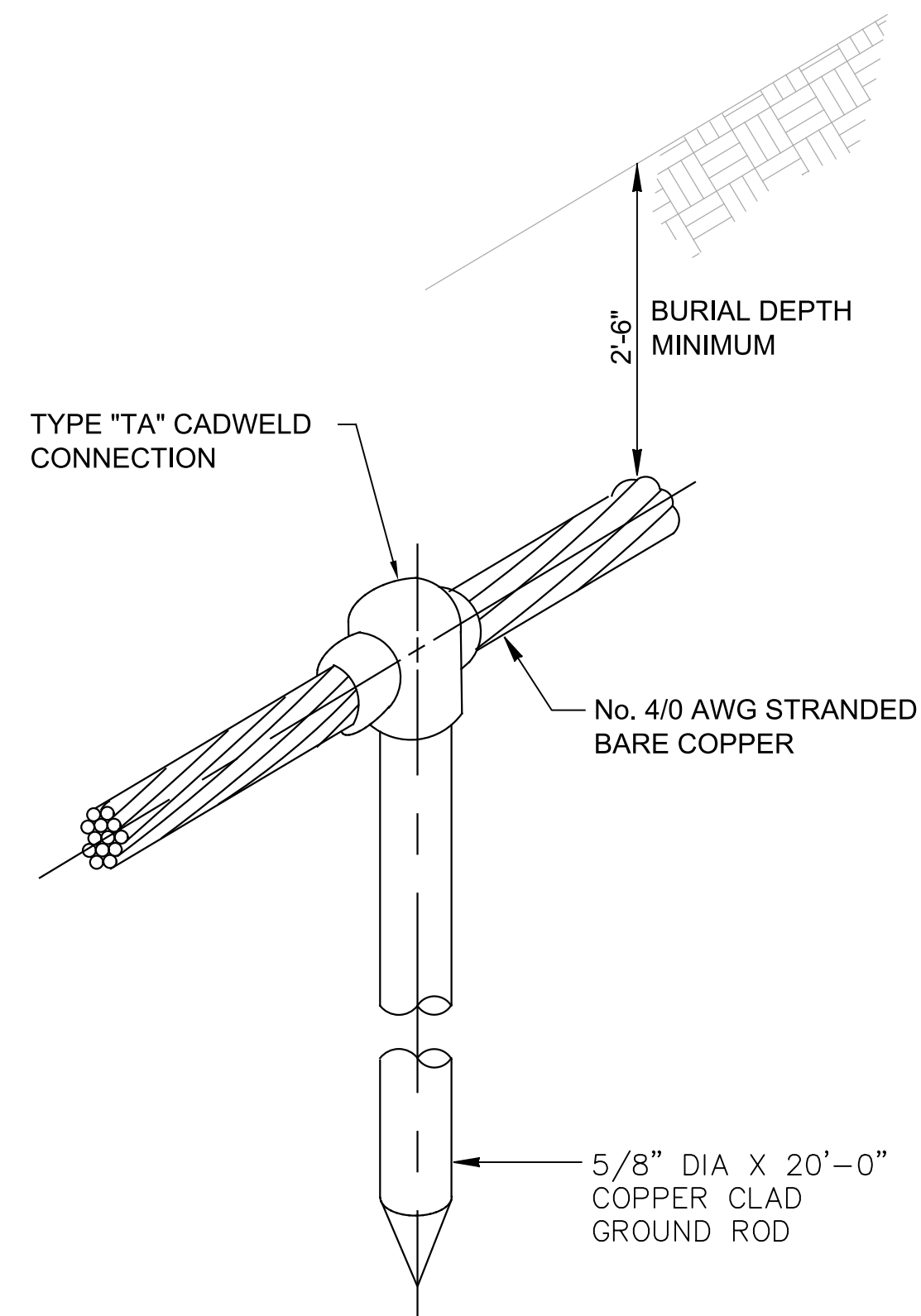


15 VAR. PANEL MOUNTING DETAIL NOT TO SCALE

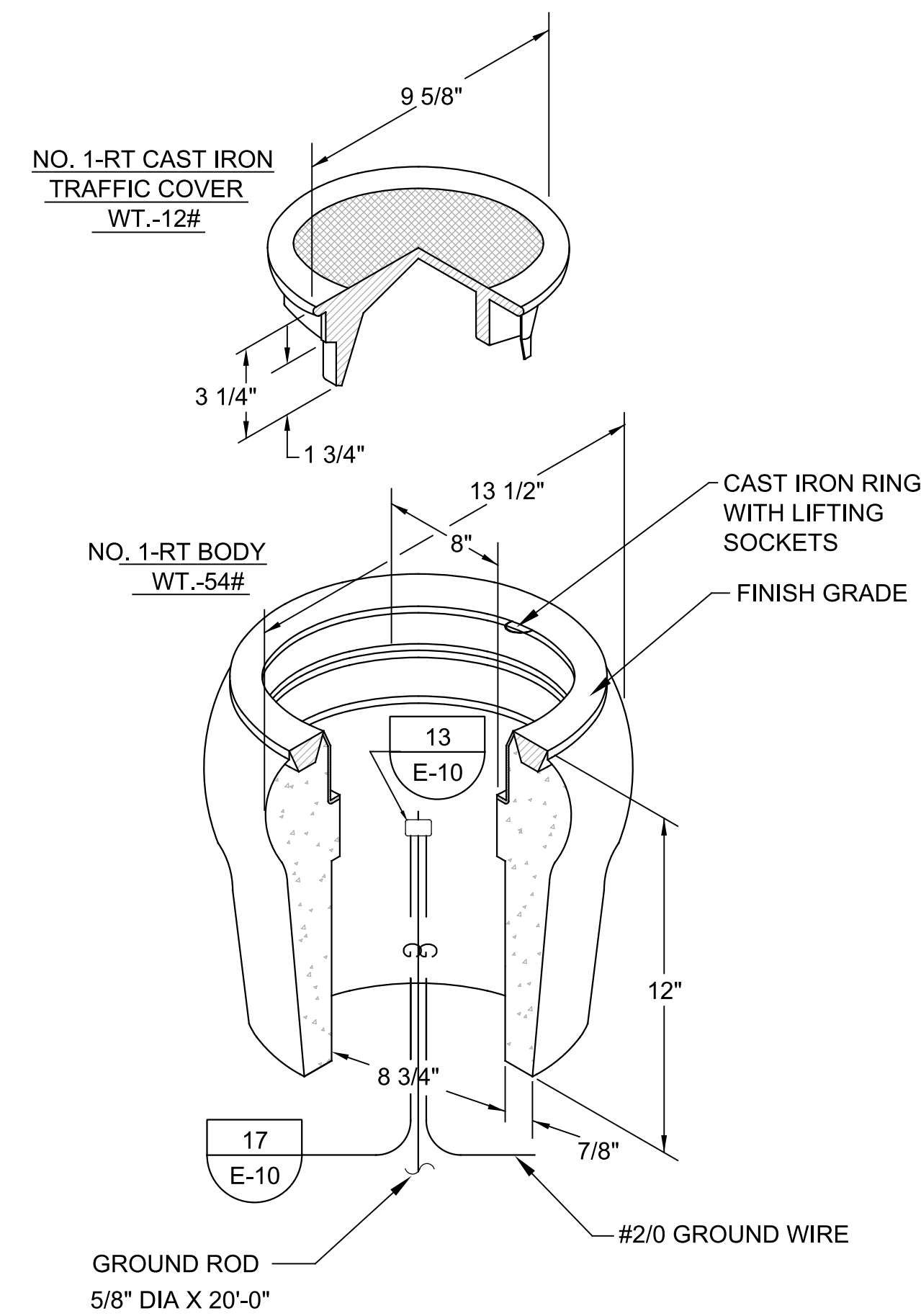


16 VAR. DISCONNECT, COMBINATION STARTER, OR SMALL PANEL PEDESTAL NOT TO SCALE

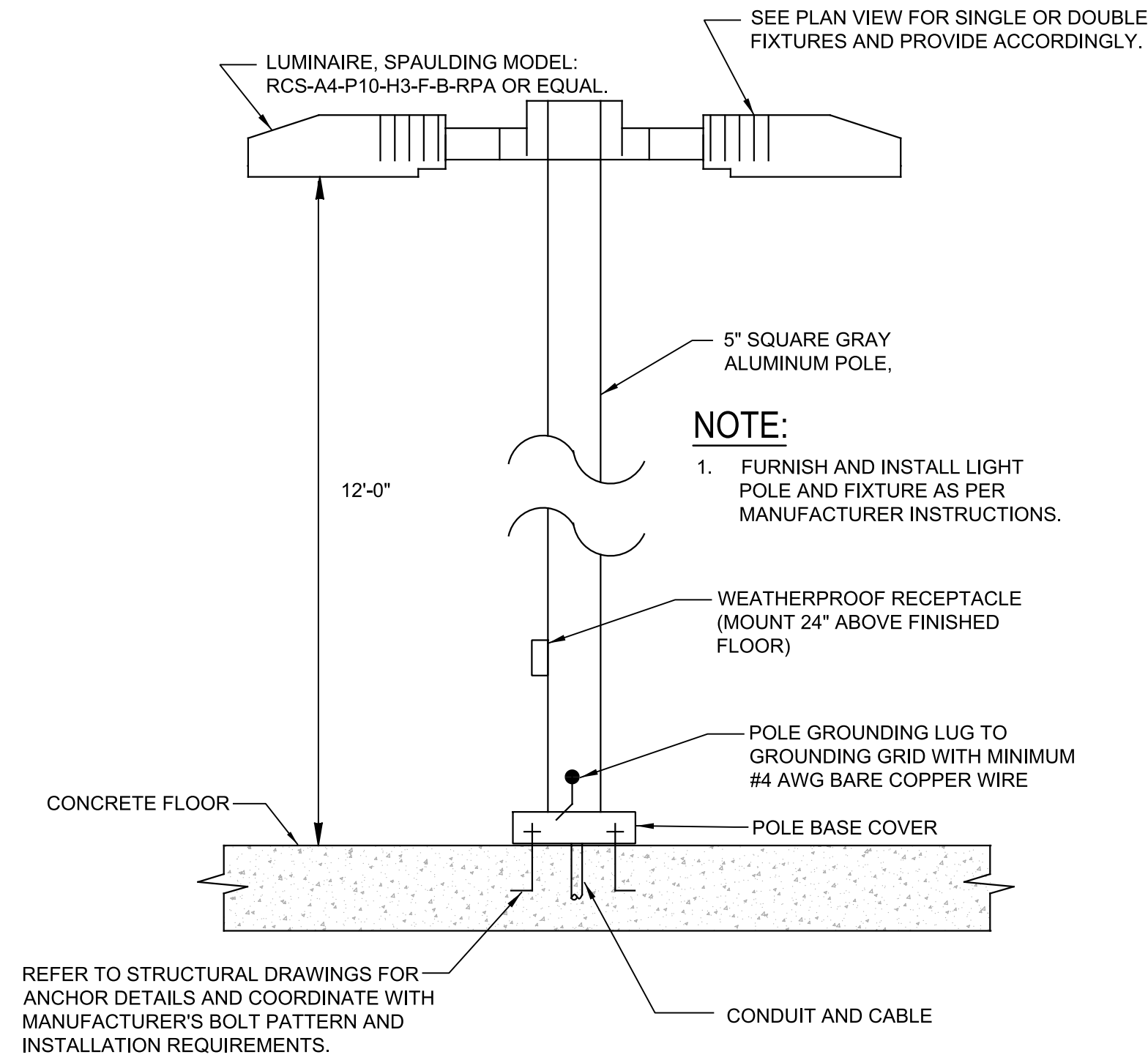
NOTE: FOR SMALL CONTROL PANEL, MINI POWER ZONE, ETC. USE THIS DETAIL FOR MOUNTING. ADJUST THE ALUMINUM CHANNEL SIZE AS REQUIRED.



17 VAR. GROUND ROD DETAIL NOT TO SCALE



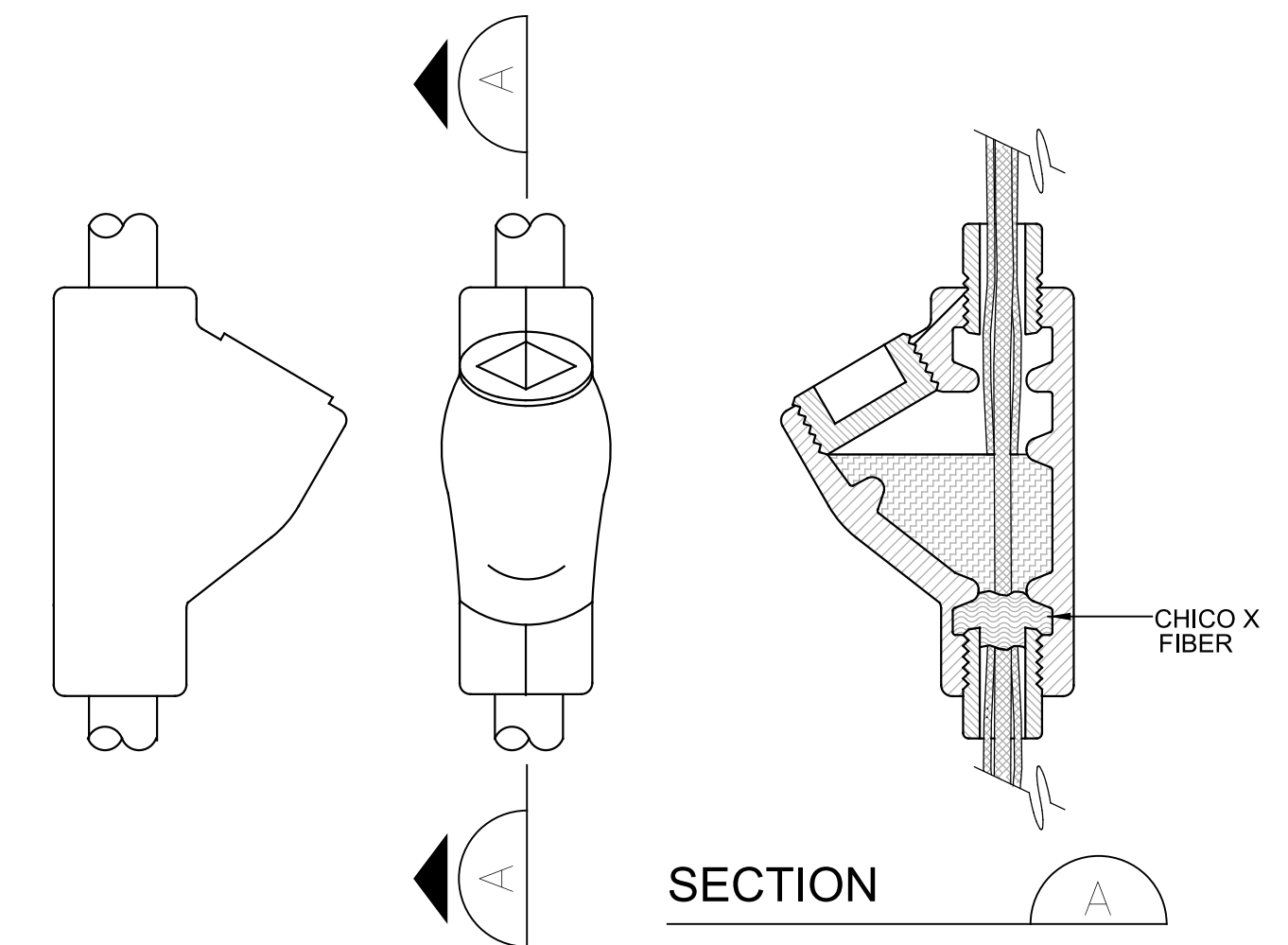
18 VAR. GROUND TEST WELL DETAIL NOT TO SCALE



19 VAR. LIGHT POLE ON CONCRETE FLOOR DETAIL NOT TO SCALE

WINDLOADING NOTE:

1. ALL POLE INSTALLATIONS MUST MEET FLORIDA BUILDING CODE WIND LOADING REQUIREMENT WITH APPROPRIATE WIND GUST FACTOR FOR THE LOCATION OF INSTALLATION. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL, A POLE WIND LOADING CALCULATION SIGNED & SEALED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED POLE AND INSTALLATIONS WILL MEET THE GIVEN WIND LOADING REQUIREMENT.



20 VAR. CONDUIT SEAL NOT TO SCALE

LAST SAVED BY: WTW

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THEIN WIN, P.E.
No. 65722



MANATEE COUNTY	
SWWRF HEADWORKS REHABILITATION	
ELECTRICAL	
ELECTRICAL DETAILS - SHEET 2	

VERIFY SCALES	JOB NO. 7880K10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. E-10
0 1"	
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	

INSTRUMENT SOCIETY OF AMERICA TABLE

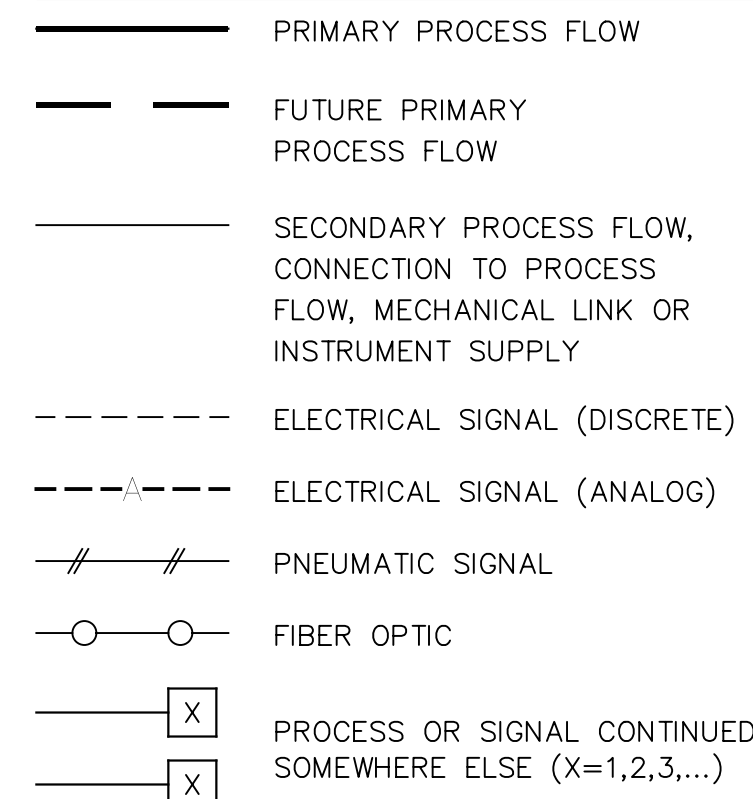
LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (*)		ALARM		USERS CHOICE (*)
B	BURNER FLAME		USERS CHOICE (*)	USERS CHOICE (*)	
C	CONDUCTIVITY			CONTROL	CLOSE
D	DENSITY (S.G.)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT		
F	FLOW RATE	RATIO			
G	GAUGE		GLASS	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTION				MIDDLE
N	STROKE		USERS CHOICE (*)	USERS CHOICE (*)	NORMAL
O	LOOP VEH. DETECTOR		OFFICE		OPEN
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT		INTEGRATE		
R	RATIO		RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE (*)		MULTIFUNCTION (*)		
V	VIBRATION			VALVE	
W	WEIGHT OR FORCE		WELL		
X	UNCLASSIFIED (*)		UNCLASSIFIED (*)	UNCLASSIFIED (*)	UNCLASSIFIED (*)
Y	PHOTO CELL		LIGHT SOURCE	RELAY OR COMPUTE (*)	
Z	POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL

NOTES:

- COMPONENTS AND PANELS SHOWN WITH A DIAMOND (◆) ARE TO BE PROVIDED UNDER SECTION "INSTRUMENTATION & CONTROLS".
- COMPONENTS AND PANELS SHOWN WITH A DOUBLE ASTERISK (**) ARE TO BE PROVIDED AS PART OF A PACKAGED OR MECHANICAL SYSTEM.
- COMPONENTS AND PANELS SHOWN WITH A TRIANGLE (▲) ARE EXISTING. COMPONENTS AND PANELS WHICH HAVE NO SYMBOL ATTACHED TO IT ARE EXISTING.
- COMPONENTS AND PANELS SHOWN WITH A HEXAGON (⬡) ARE EXISTING TO BE MODIFIED AND/OR RELOCATED.
- COMPONENTS AND PANELS SHOWN WITH A SQUARE (■) ARE FUTURE. DURING SHOP DRAWING PREPARATION, THE CONTRACTOR SHALL FIELD VERIFY ALL THE EXISTING ANALOG AND DISCRETE POINTS FOR DETAILED INTERFACE AND INCLUDE IT AS PART OF SUBMITTAL.
- THE SINGLE INSTRUMENT & CONTROL SUPPLIER SHALL HAVE A U.L. APPROVED SHOP.
- ALL PROCESS TUBING AND ISOLATION VALVES SHALL BE 1/4" - 316 S.S., UNLESS OTHERWISE NOTED.
- ALL CONTROL PANELS SHALL BE FURNISHED AND INSTALLED WITH A 1P-15A CIRCUIT BREAKER, UNLESS OTHERWISE NOTED.
- SEE MECHANICAL PLANS AND SPECIFICATIONS FOR EQUIPMENT NUMBERS.

INSTRUMENT LINE SYMBOLS

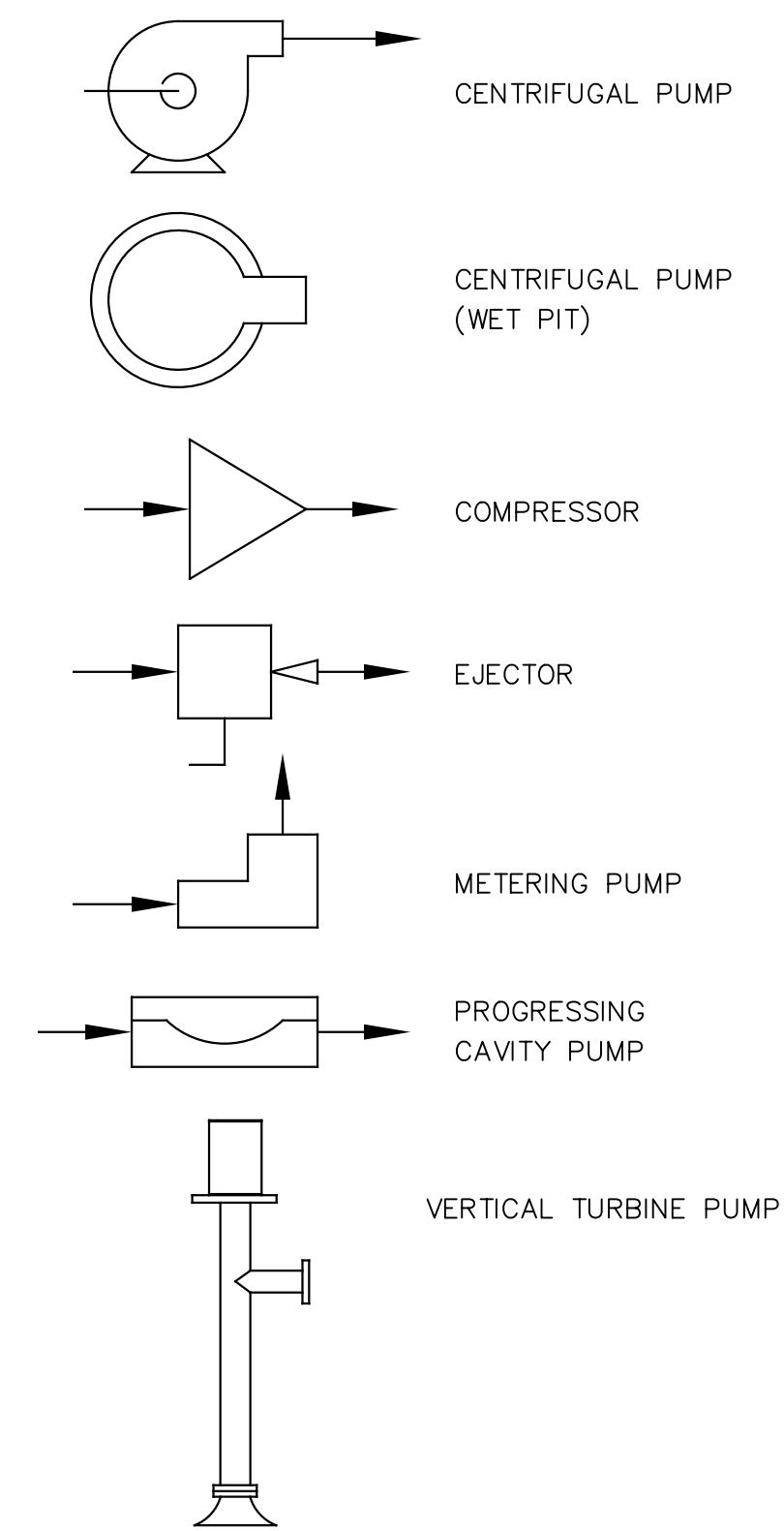


INSTRUMENT ABBREVIATION

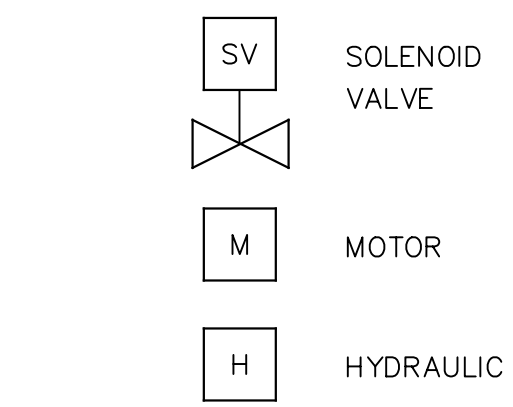
ACC	ACCELERATOR
BFP	BELT FILTER PRESS
CL2	CHLORINE
CLW	CLEARWELL
COM	COMMON
COND	CONDUCTIVITY
CP	CONTROL PANEL
DI, AI	DISCRETE INPUT, ANALOG INPUT
DO, AO	DISCRETE OUTPUT, ANALOG OUTPUT
D.O.	DISSOLVED OXYGEN
DR	DISTANCE RELAY
EFFL	EFFLUENT
EP	ELECTRICAL PANEL
ES	EMERGENCY STOP
ETM	ELAPSED TIME METER
FD	CHEMICAL FEEDER
FIL	FILTER
GEN	GENERATOR
HLO	HIGH-LOW-OFF
HLOR	HIGH-LOW-OFF-REMOTE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HOTC	HAND-OFF-TIMER-COMPUTER
H/L	HIGH/LOW
HSP	HIGH SERVICE PUMP
INFL	INFLUENT
JP	JOCKEY PUMP
LOS	LOCK-OUT-STOP
LPU	LINE PROTECTION UNIT
MCC	MOTOR CONTROL CENTER
MCP	MAIN CONTROL PANEL
ME	MISCELLANEOUS EQUIPMENT
M.G.	MILLION GALLON
MOV	MOTOR OPERATED VALVE
OCA	OPEN-CLOSE-AUTO
OC	OPEN-CLOSE
OO	ON-OFF
ORP	OXIDATION REDUCTION POTENTIAL
OSC	OPEN-STOP-CLOSE
OSCR	OPEN-STOP-CLOSE-REMOTE
PH	HYDROGEN ION CONCENTRATION
PRES	PRESSURE
RES	RESTORE
RF	RF (ADMITTANCE) LEVEL MONITOR
RIP, RIO	REMOTE I/O PANEL
R/L	REMOTE/LOCAL
RSP	REMOTE SETPOINT
SA	SURGE ARRESTER
SEC	SECONDARY
SL	SLAKER
SF	SONIC FLOWMETER
SP	SETPOINT
SS	START/STOP
ST	STEP
STOR	STORAGE
SUS	SUSPENDED SOLIDS
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER
TD	THERMAL DISPERSION
TP	TRANSFER PUMP
TURB	TURBIDITY
VFD	VARIABLE FREQUENCY DRIVE

INSTRUMENTATION LEGEND

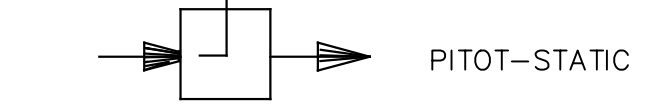
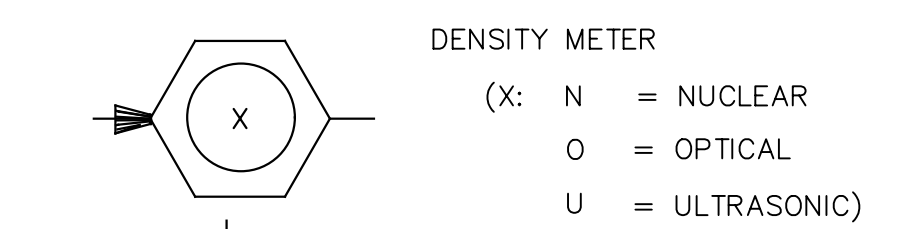
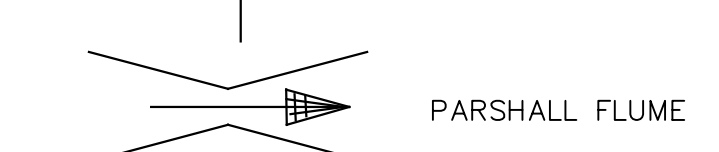
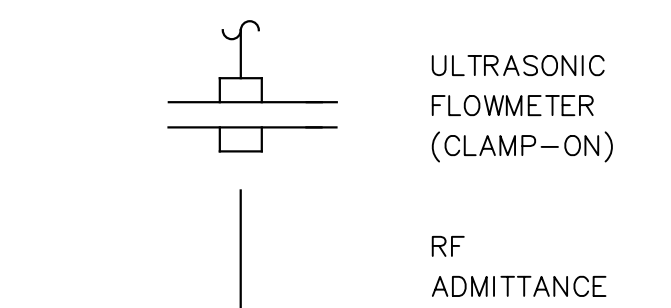
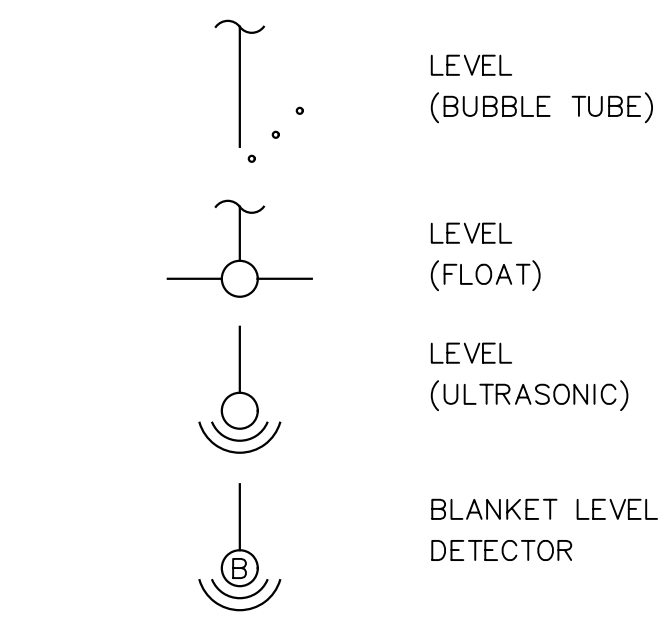
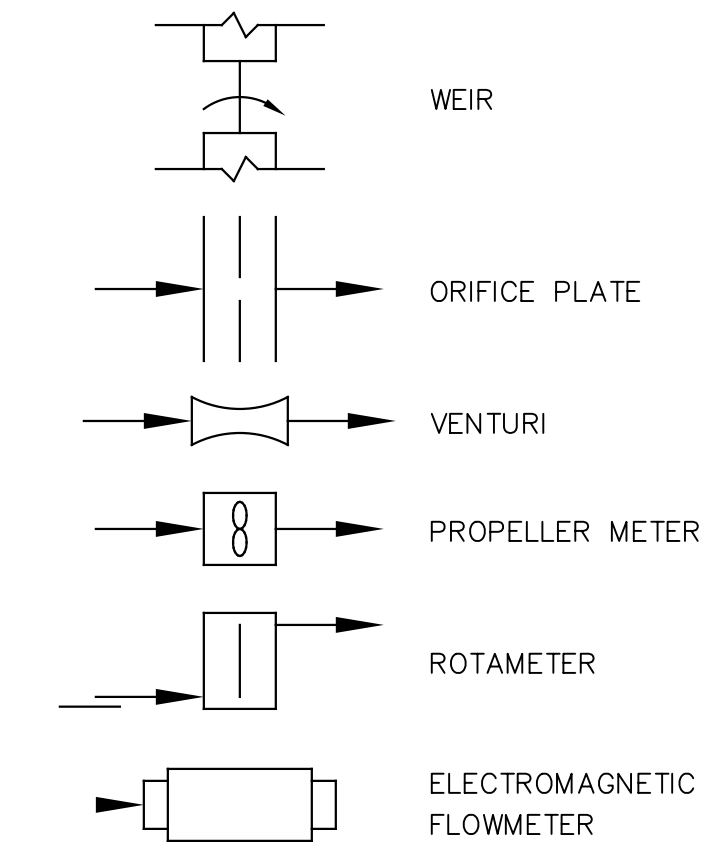
PUMPS & COMPRESSORS



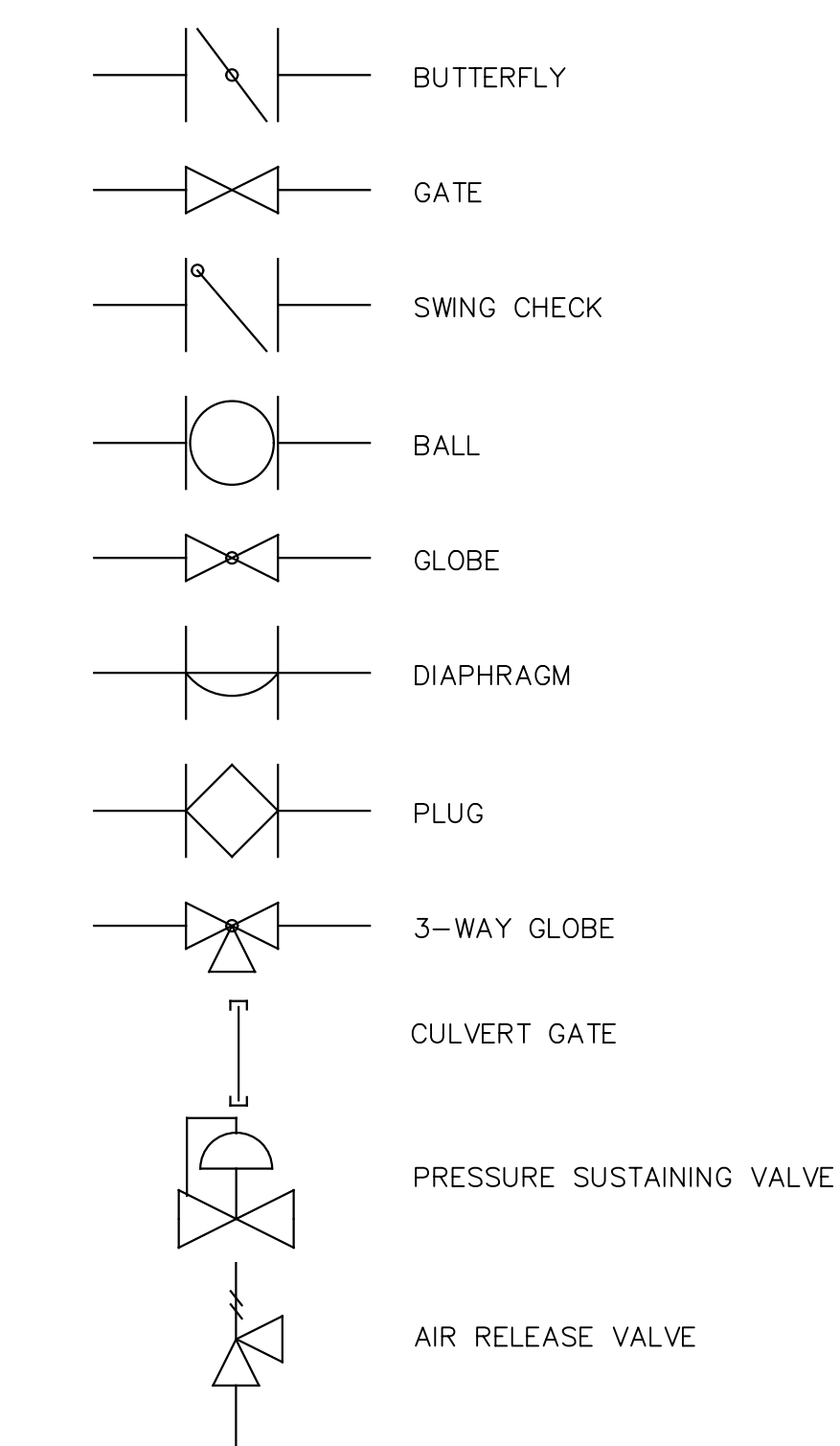
ACTUATOR OR OPERATORS



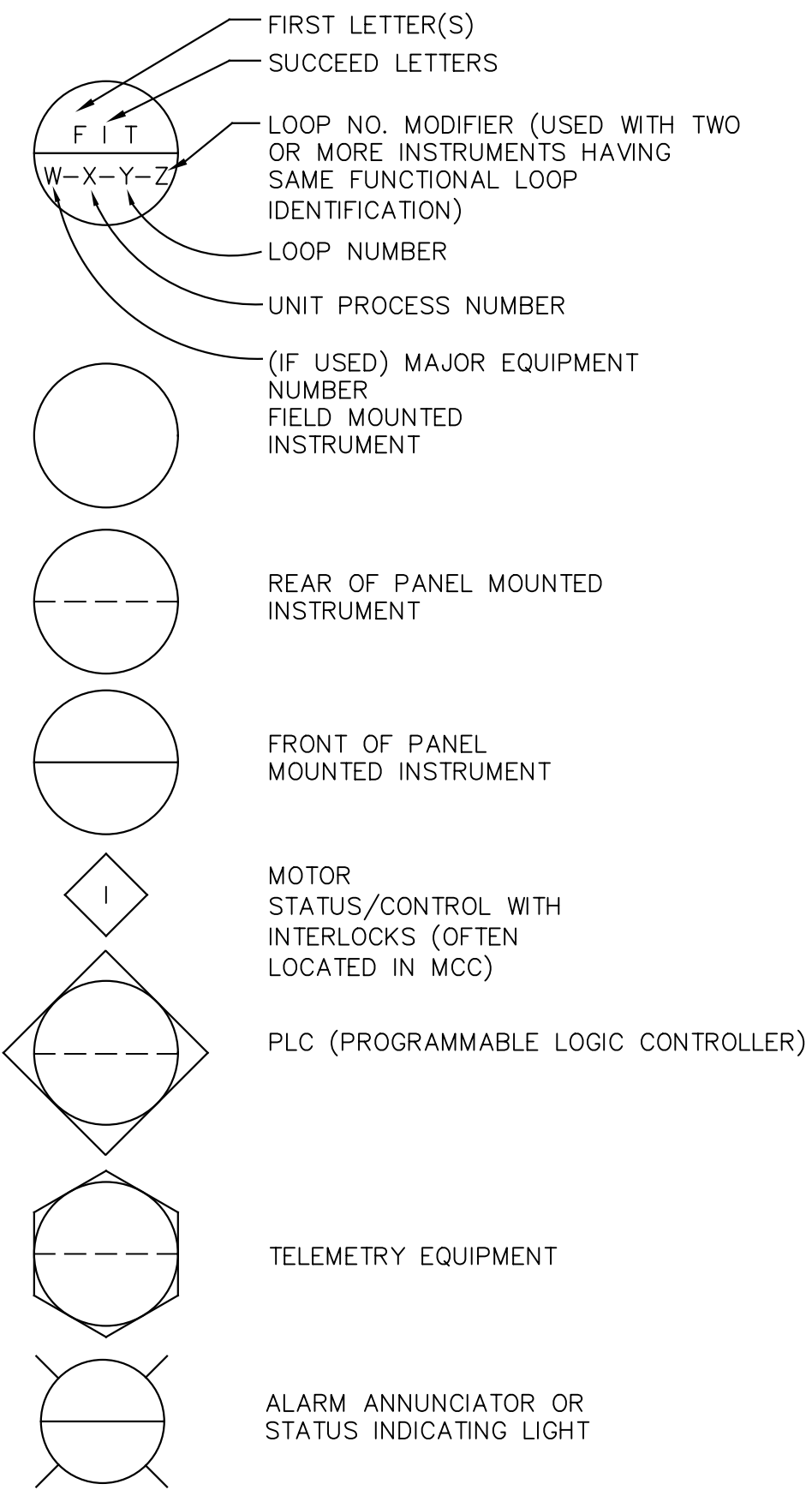
PRIMARY ELEMENTS



VALVES & GATES



INSTRUMENT IDENTIFICATION



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DRAWN	DEU
CHECKED	PFH
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THEIN WIN, P.E.
 No. 66722



MANATEE COUNTY
SWWRF HEADWORKS REHABILITATION
 ELECTRICAL
INSTRUMENTATION LEGEND AND SYMBOLS

VERIFY SCALES
 BAR IS ONE INCH ON ORIGINAL DRAWING

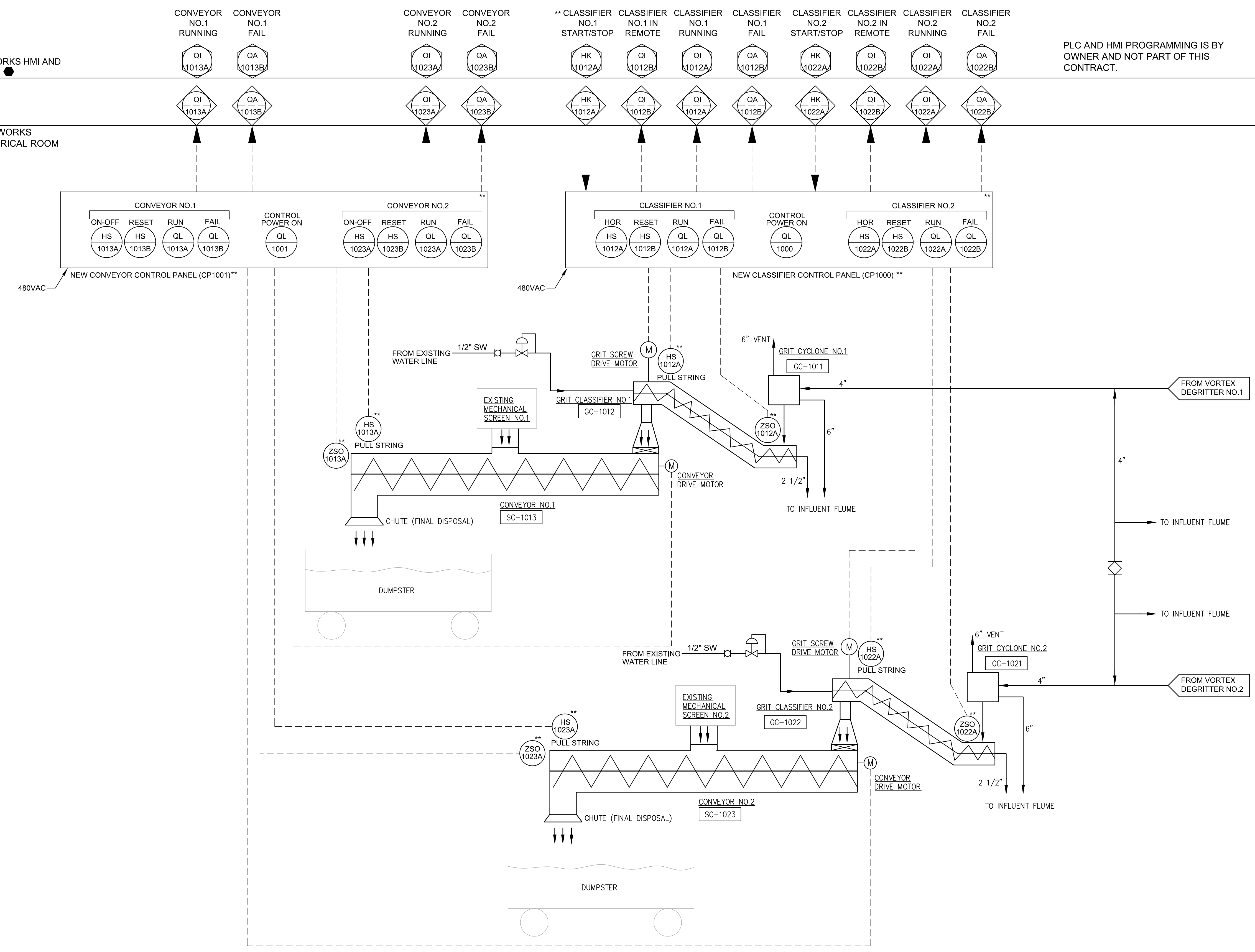
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 7880K10
 DRAWING NO. N-1

EXISTING HEADWORKS HMI AND PLANT HMI/SCADA

EXISTING PLANT PLC
LOCATION: HEADWORKS BUILDING - ELECTRICAL ROOM

PLC AND HMI PROGRAMMING IS BY OWNER AND NOT PART OF THIS CONTRACT.



LAST SAVED BY: nwn

REV	DATE	BY	DESCRIPTION

DESIGNED TW
DRAWN DEU
CHECKED PFH
DATE SEPTEMBER 2012

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
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LICENSE NO: EB 0006877

THEIN WIN, P.E.
No. 65722



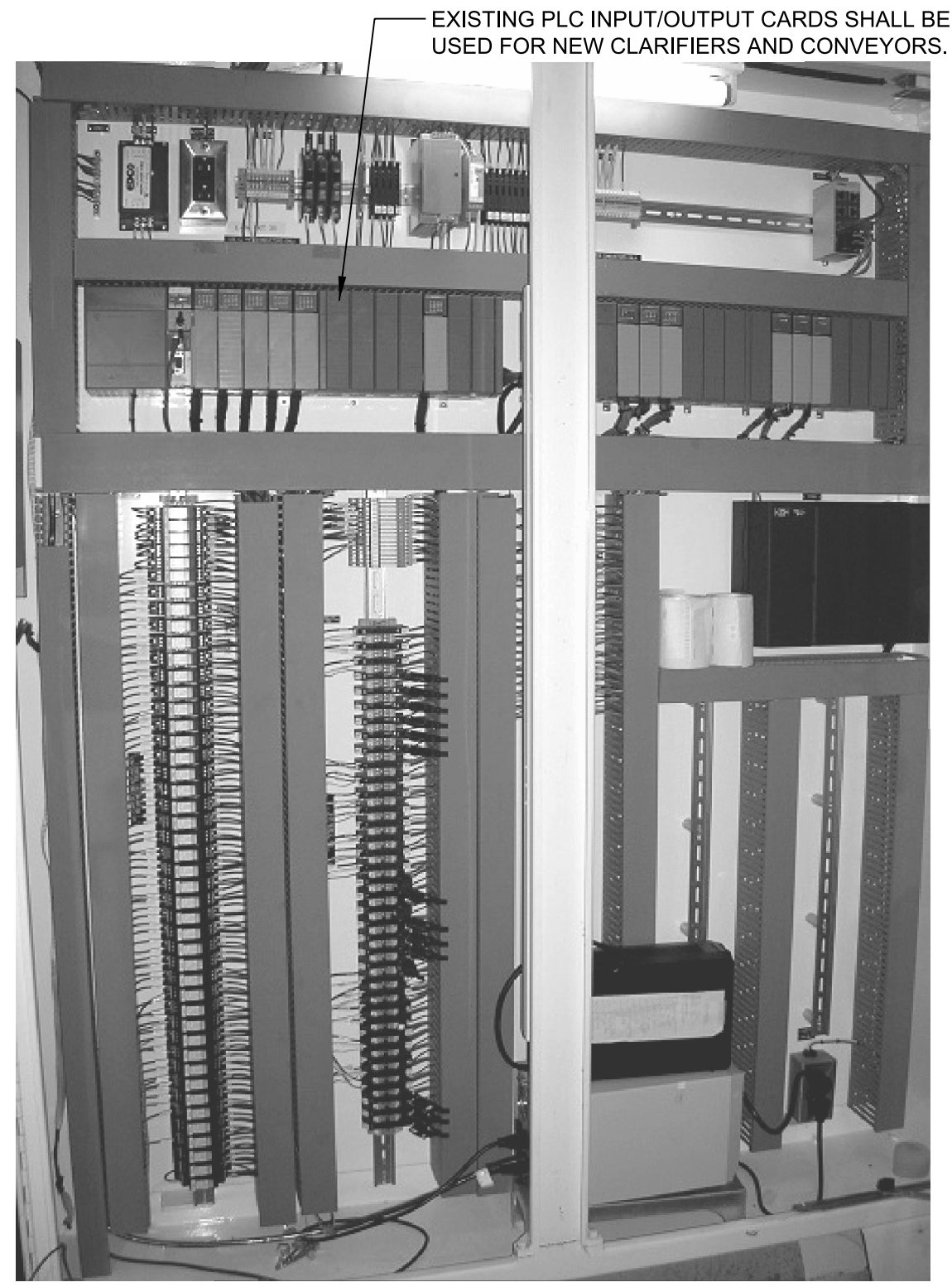
MANATEE COUNTY
SWWRF HEADWORKS REHABILITATION
ELECTRICAL
P&ID - GRIT CLASSIFIERS AND CONVEYORS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO.
7880K10
DRAWING NO.
N-2



EXISTING HEADWORKS PLC PANEL
NOT TO SCALE



EXISTING HEADWORKS PLC PANEL - INTERIOR
NOT TO SCALE

EXISTING HEADWORKS PLC PANEL AS-BUILT I/O DRAWINGS ARE AVAILABLE IN THE PANEL. CONTRACTOR SHALL IDENTIFY AND VERIFY THE SPARE I/O POINTS AS STATED IN DRAWING E-8 FOR NEW SIGNALS. TERMINATE NEW SIGNALS USING EXISTING SPARE TERMINAL POINTS AS SHOWN ON AS-BUILT DRAWINGS. IF ANY SPARE POINTS ARE USED, COORDINATE WITH ENGINEER TO CONNECT TO OTHER SPARE POINTS. PROVIDE UPDATE LOOP DIAGRAMS AFTER INSTALLATION.

LAST SAVED BY: WTW

				DESIGNED TW	HILLERS ELECTRICAL ENGINEERING, INC. 23257 STATE ROAD 7, SUITE 100 BOCA RATON, FLORIDA 33428 <small>(561) 451-9185 (561) 451-4886 FAX LICENSE NO: EB 0006877</small>		MANATEE COUNTY		VERIFY SCALES	JOB NO. 7880K10
				DRAWN DEU			SWWRF HEADWORKS REHABILITATION		BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO.
				CHECKED PFH			ELECTRICAL		0 1"	N-3
				DATE SEPTEMBER 2012			EXISTING PLC PANEL PHOTOS AND INSTRUMENTATION DETAIL		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	
REV	DATE	BY	DESCRIPTION	THEIN WIN, P.E. No. 65722						
PROJECT NO: 7880K10				FILENAME: 7880K10-N-03.dwg						