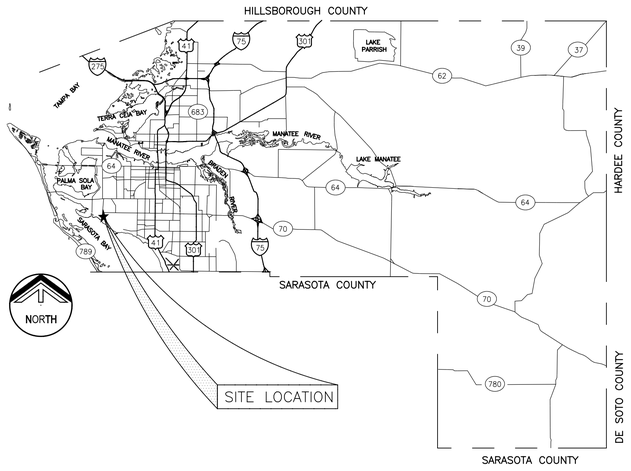
MANATEE COUNTY GOVERNMENT
PUBLIC WORKS DEPARTMENT
(MANATEE COUNTY, FLORIDA)

SOUTHWEST WATER RECLAMATION FACILITY
CLARIFIER 1 & 2 REHABILITATION

MANATEE COUNTY PROJECT NO. 6078980

JULY 2011



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N-06	MONITORING INSTRUMENTATION SCADA CABINET

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401 NORTH CATTLEMEN ROAD, SUITE 306
SARASOTA, FL 34232
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CA 00008571

JOB NO. 7880I10
DRAWING NO. G-01

Last Opened by: 6-13-11 08:58am DPerry

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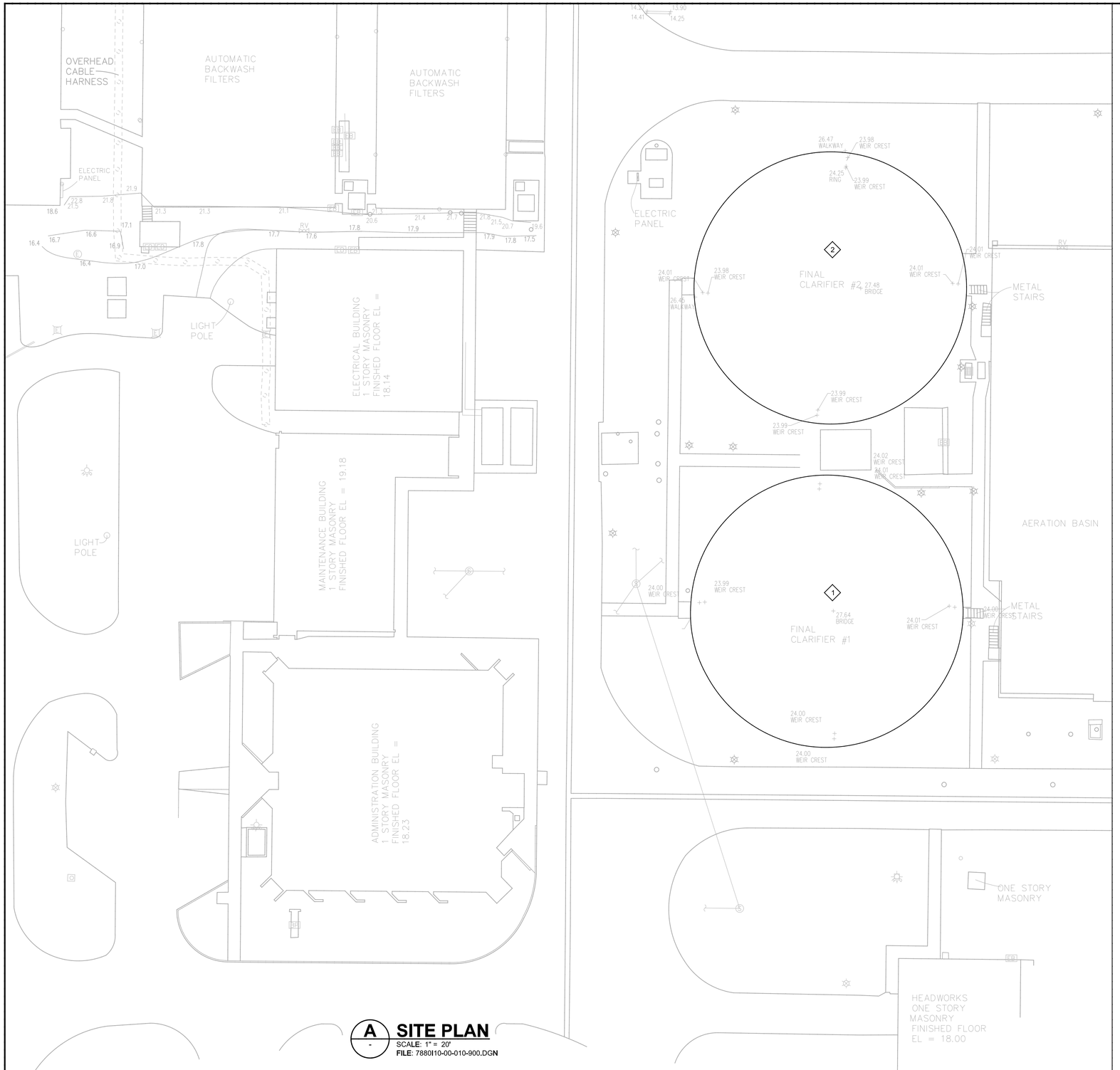


A **SITE PLAN**
SCALE: 1" = 20'
FILE: 7880I10-00-010-900.DGN

KEY NOTES:

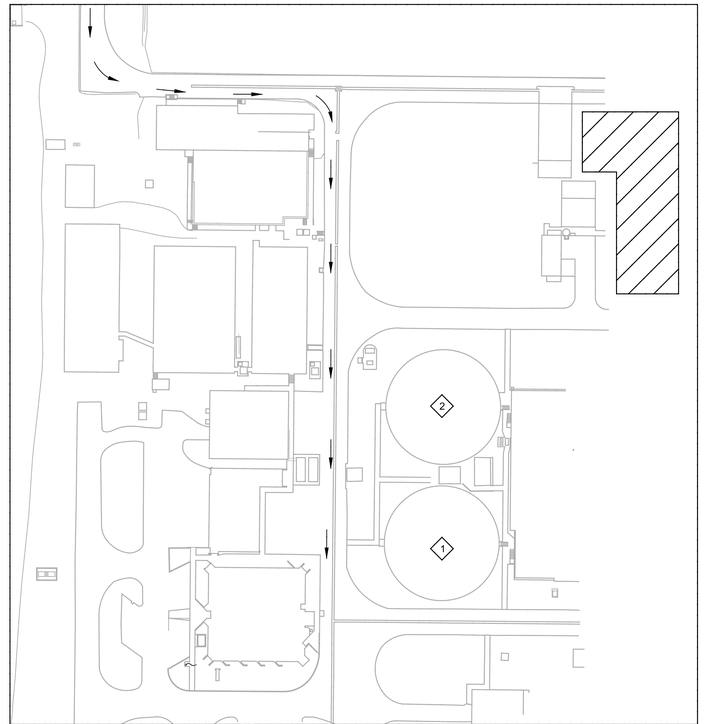
1. CLARIFIER NO.1
2. CLARIFIER NO.2

CONTRACTOR STAGING AREA

N

GENERAL NOTES:

1. ALL WORK TO BE IN ACCORDANCE WITH MANATEE COUNTY PUBLIC WORKS UTILITY STANDARDS, LATEST EDITION IN AFFECT AT TIME OF BID.
2. CONTRACTOR SHALL COORDINATE WITH OWNER ON ACCESSING THE PLANT SITE AND MOVEMENT WITHIN THE PLANT SITE. OTHER CONSTRUCTION PROJECTS WILL BE ON GOING DURING WORK UNDER THIS CONTRACT.
3. EXISTING FACILITY AND UTILITY INFORMATION SHOWN ON THE DRAWINGS WAS OBTAINED FROM EXISTING OWNER'S RECORDS. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR FACILITIES AND UTILITIES NOT SHOWN OR NOT IN THE LOCATION SHOWN. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL LOCATIONS, MATERIALS, AND ELEVATIONS IN THE AREAS OF CONSTRUCTION.
4. THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY CONCERNING ANY CONFLICTS ARISING DURING CONSTRUCTION OF ANY IMPROVEMENTS SHOWN ON THESE DRAWINGS.
5. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING FACILITIES AND UTILITIES SHOWN OR NOT SHOWN WHICH ARE TO REMAIN IN PLACE FROM DAMAGE. ALL FACILITIES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED IMMEDIATELY TO THE ENGINEER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE WITHOUT ADDITIONAL COMPENSATION.
6. CONTRACTOR SHALL RESTORE STAGING AREA TO ORIGINAL CONDITION. SOD ALL AREAS DISTURBED BY CONSTRUCTION.
7. ELEVATIONS ARE BASED ON SITE DATUM NATIONAL GEODETIC VERTICAL DATUM 1929 (NGVD 29).



B **SITE PLAN DETAIL**
SCALE: N.T.S.
FILE: 7880I10-00-010-900.DGN

REV	DATE	BY	DESCRIPTION

DESIGNED EP
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DATE JULY 2011

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
GENERAL
EXISTING SITE PLAN

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

JOB NO. 7880I10
DRAWING NO. G-02

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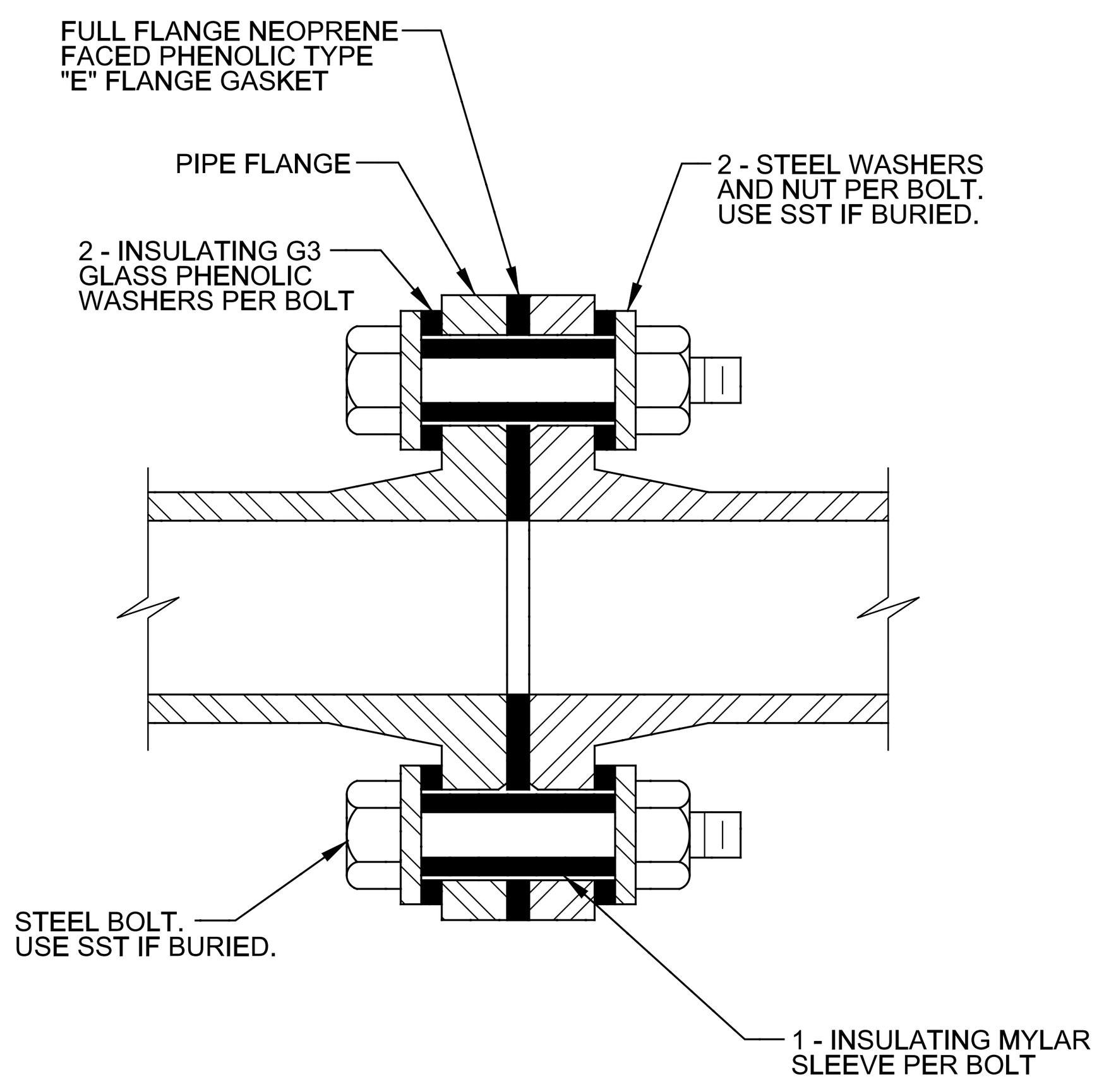
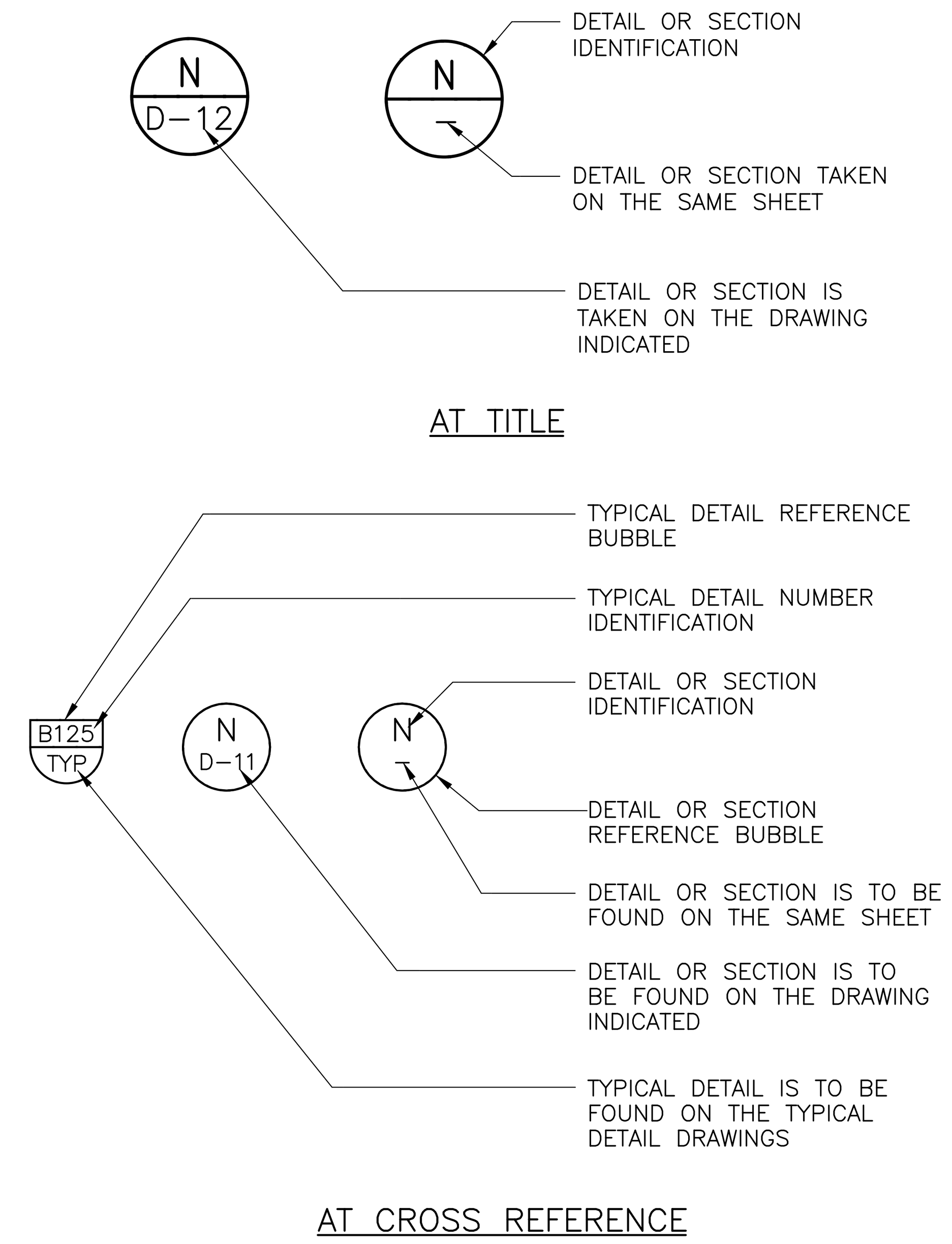
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-G-002.dgn



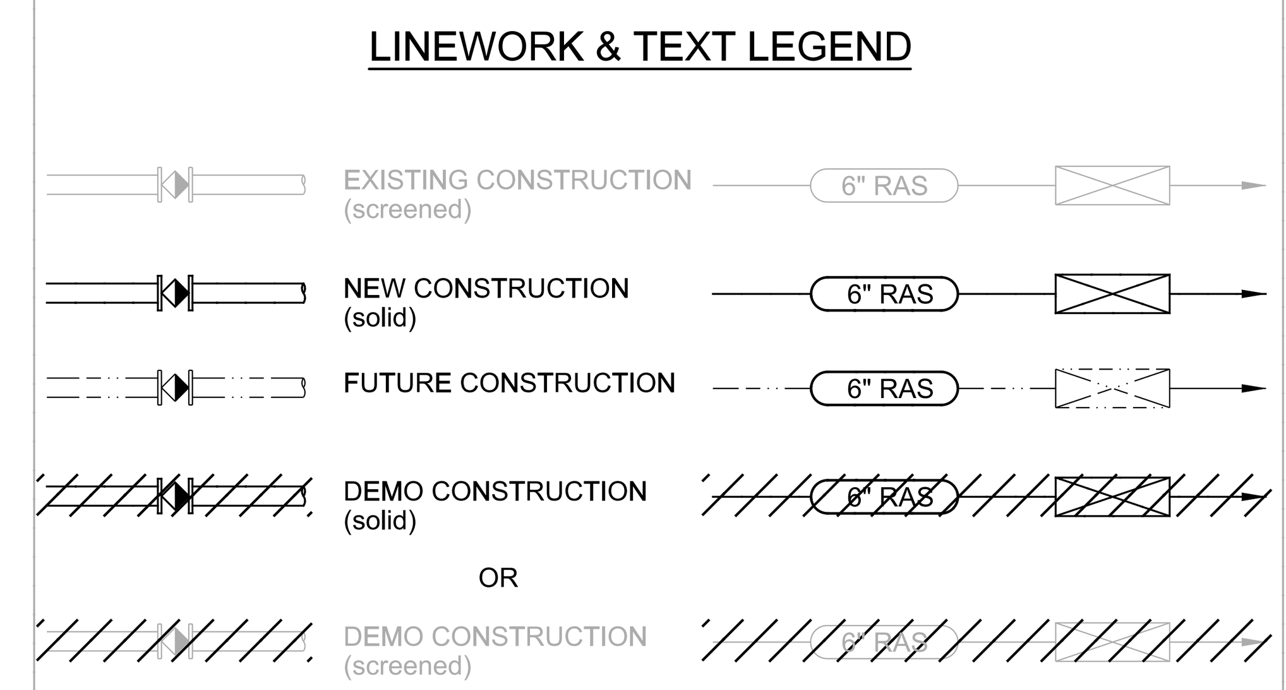
NOTE:

1. IF FLANGE IS TO BE BURIED, COAT ENTIRE ASSEMBLY WITH PETROLATUM SATURATED FABRIC TAPE WRAP SYSTEM IN ACCORDANCE WITH THE SPECIFICATIONS.

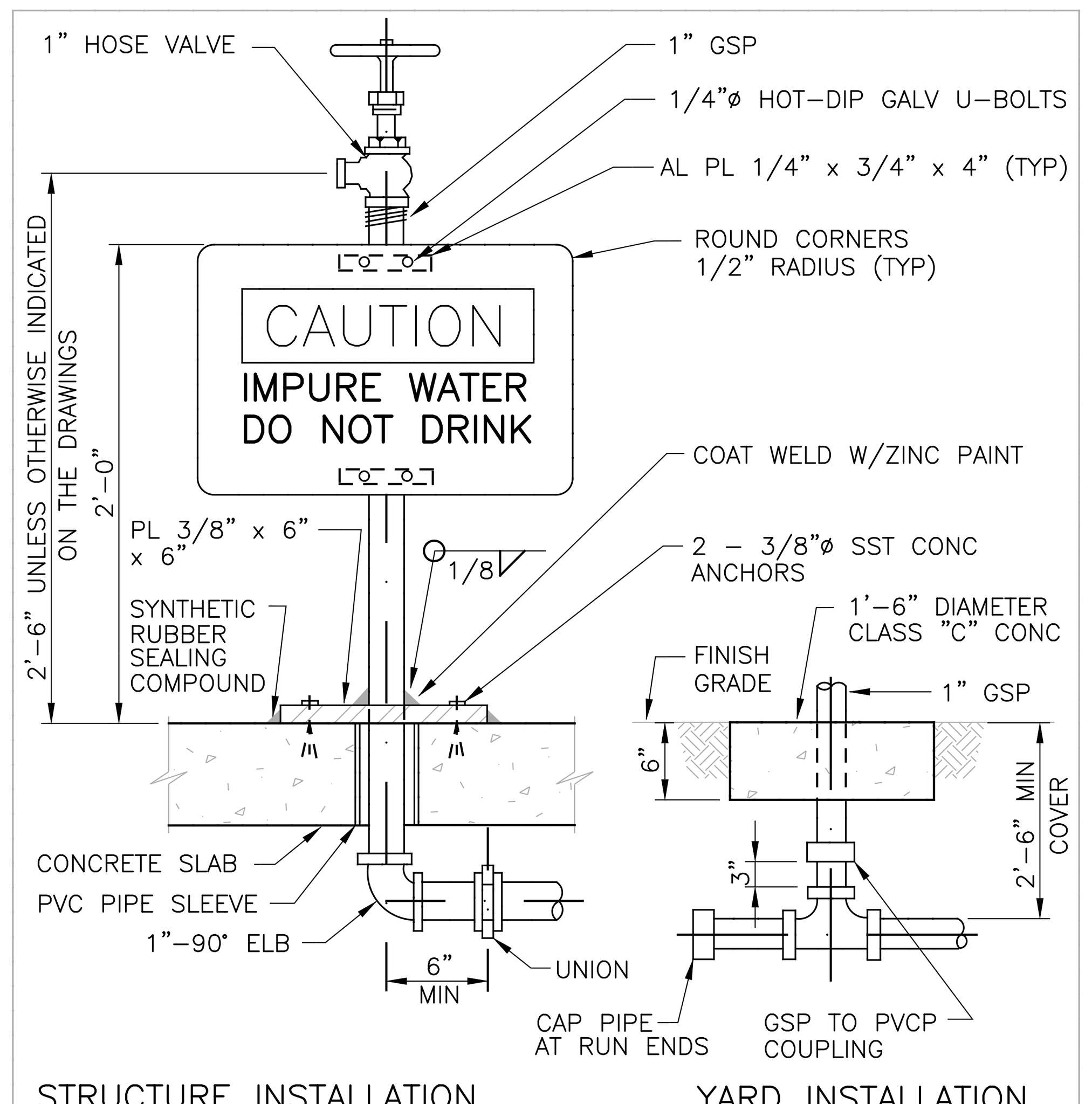
D062 TYP N — PIPE FLANGE INSULATION — 08/01/05



G034 TYP S — DRAWING CROSS REFERENCE — 08-01-05



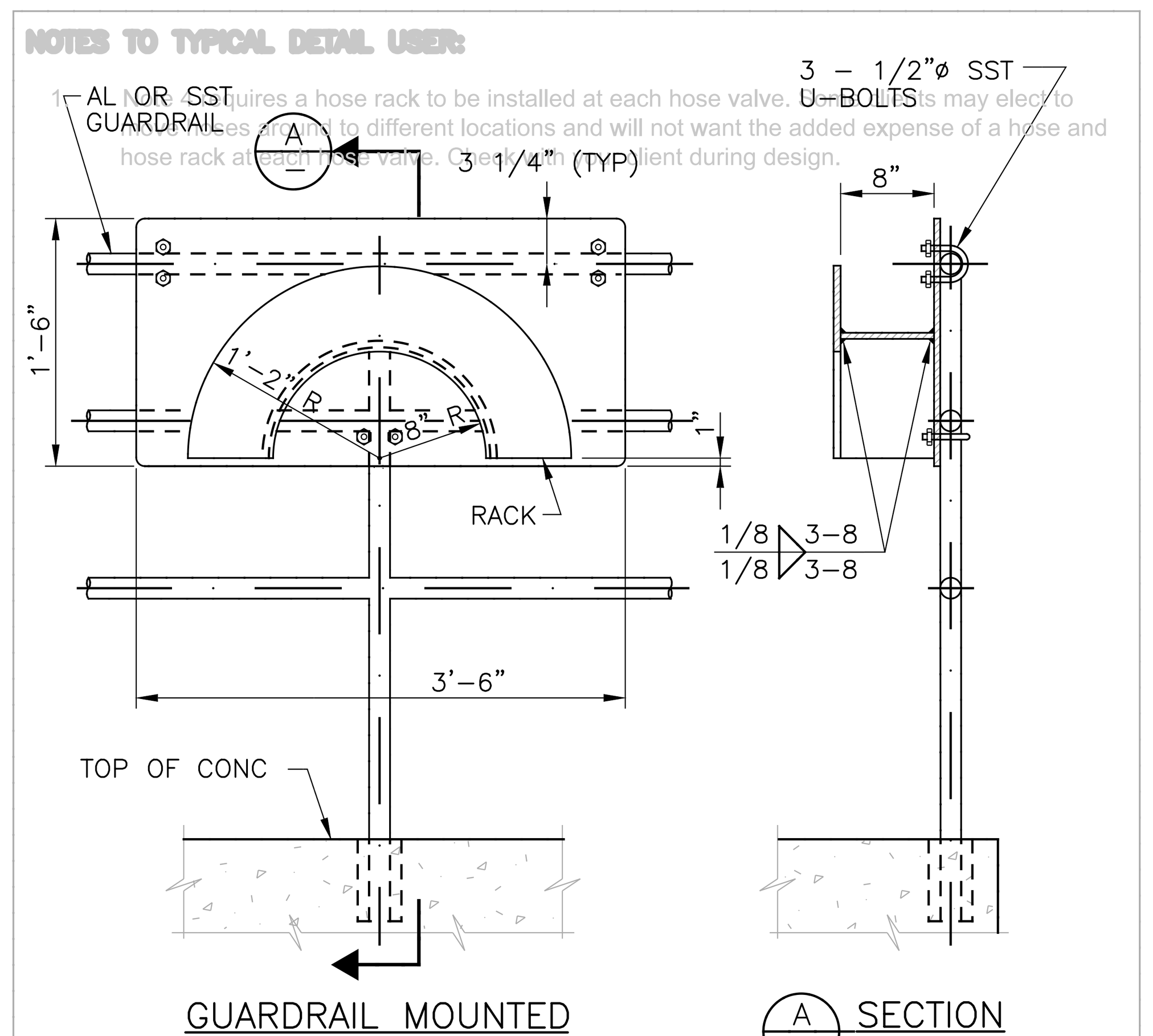
G035 TYP J — LINEWORK AND TEXT LEGEND — 01-05-11



NOTES:

1. SIGN SHALL BE 3/8" THICK PLASTIC RESISTANT TO SUNLIGHT (ULTRAVIOLET) DETERIORATION.
2. SIGN SHALL BE 7" x 10" AND SHALL CONFORM TO THE SPECIFICATIONS.
3. SIGN AS SHOWN IS ROTATED 90° OFF TRUE POSITION. SIGN SHALL BE MOUNTED TO PERMIT EASY READING.
4. INSTALL HOSE RACK, M280 TYP, AT EACH HOSE VALVE.

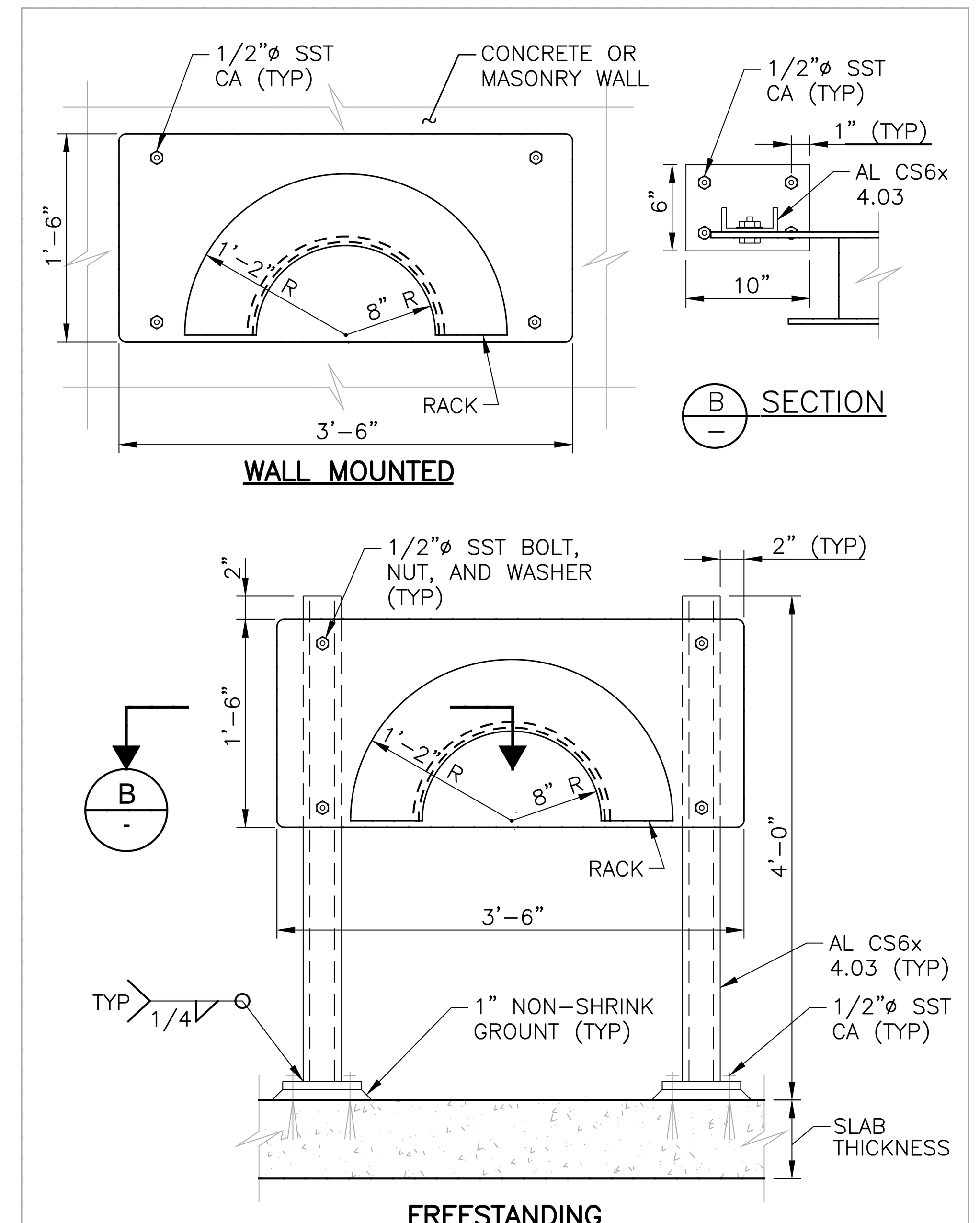
M276 TYP NS — 1" HOSE VALVE AND SIGN — 08-01-05



NOTES:

1. HOSE RACK SHALL BE FABRICATED FROM 3/16" ALUMINUM PLATE. ROUND ALL EDGES SMOOTH.
2. HOSE RACKS INSTALLED IN YARD LOCATIONS SHALL BE FREESTANDING A 4'-6" LONG x 2'-0" WIDE x 8" DEEP CONCRETE PAD W/#5@12" EW CENTERED.
3. WALL MOUNTED HOSE RACKS ON MASONRY WALL SHALL BE FASTEN TO GROUTED CELLS.

M280 TYP S — HOSE RACK — SHEET 1 OF 2 — 09-30-07



M280 TYP S — HOSE RACK — SHEET 2 OF 2 — 09-30-07

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
DETAILS
TYPICAL DETAILS

VERIFY SCALES
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0 1"
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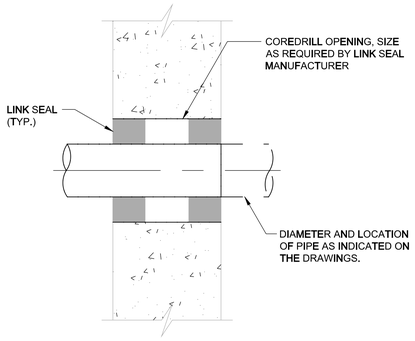
JOB NO. 7880I10
DRAWING NO. T-01

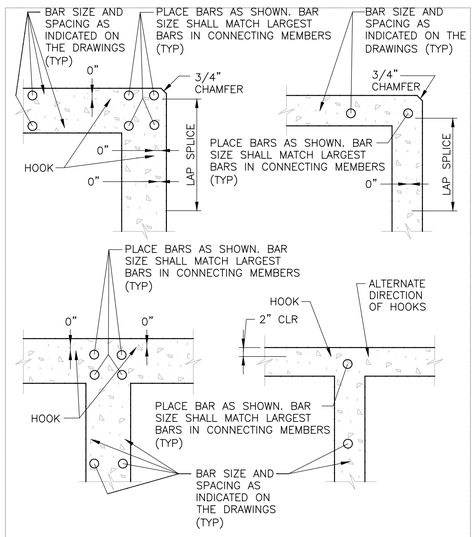
LAST SAVED BY: dperry
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-T-001.dgn



NOTES:

1. USE TWO LINK SEALS FOR WALLS WITH A THICKNESS OF 12 INCHES OR GREATER.

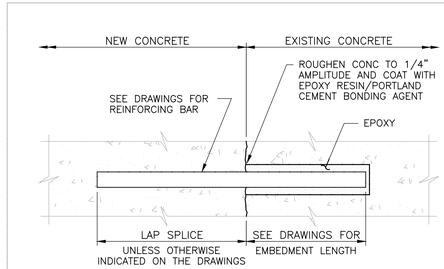
P301 TYP — COREDRILL PIPE PENETRATION THROUGH EXISTING WALL



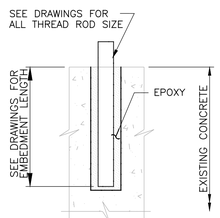
NOTE:

1. ALL HOOKS SHALL BE ACI STD 90 DEGREE HOOKS.

S144 TYP S — REINFORCEMENT AT CORNERS AND JUNCTIONS — 08-22-08



REINFORCING BARS

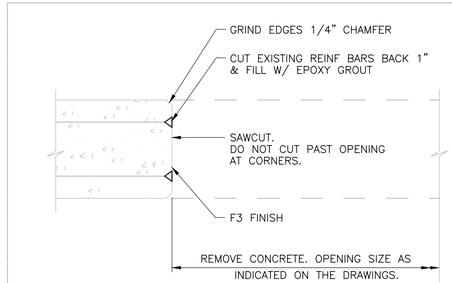


NOTE:

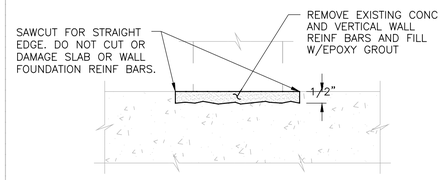
ALL-THREAD RODS

1. INSTALLATION OF REINFORCING BARS AND ALL THREAD RODS AS INDICATED IN THE SPECIFICATIONS.

S194 TYP N — EPOXY BONDED REINFORCING BARS OR ALL THREAD RODS — 04-30-07



A — HEAD OR JAMB DETAIL



B — SILL DETAIL

S198 TYP N — OPENING THROUGH EXISTING CONCRETE — 08-01-05

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SWWRF CLARIFIER 1&2 REHABILITATION
DETAILS
TYPICAL DETAILS

VERIFY SCALES
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0 — 1"
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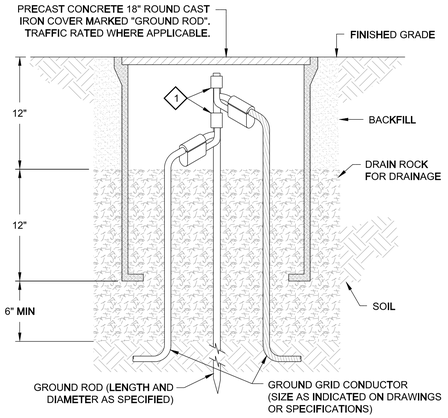
JOB NO. 7880I10
DRAWING NO. T-02

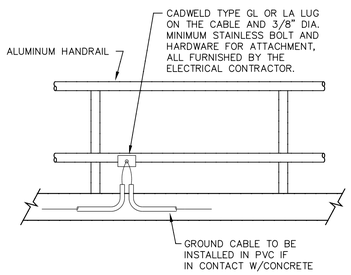
LAST SAVED BY: dperry
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-T-002.dgn



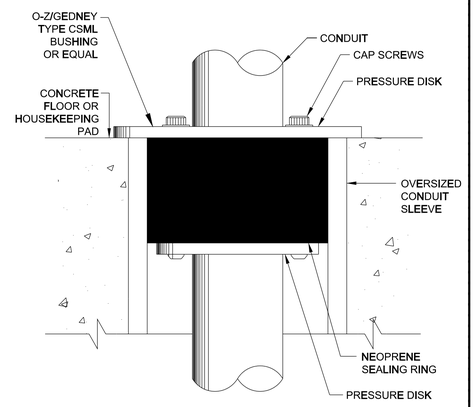
KEY NOTES:

1 GROUND ROD TO GROUND GRID CROSS CONNECTOR. SIZE FOR ROD AND CABLE PER MANUFACTURERS GUIDELINES.

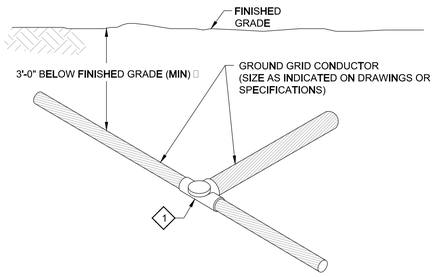
EG001 TYP S — GROUND ROD AND GROUNDWELL COMPRESSION CONNECTION



EG94 TYP — ALUMINUM HANDRAIL GROUNDING DETAIL



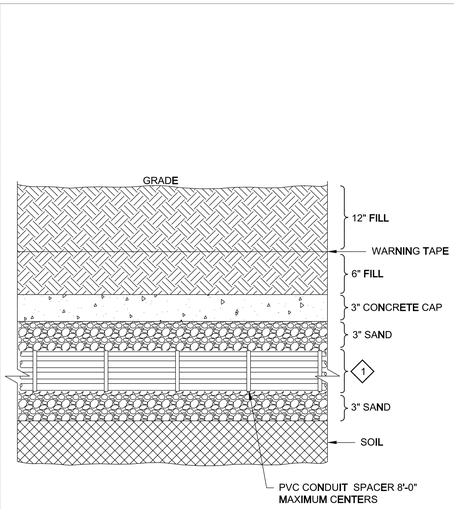
EM137 TYP S — CUSTOM CAST IN PLACE SLEEVE



KEY NOTES:

1 HORIZONTAL TEE CONNECTION.

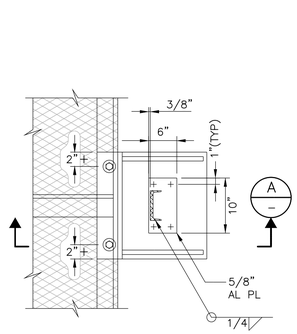
EG151 TYP S — COPPER GROUNDING CABLE CONNECTION EXOTHERMIC CONNECTION

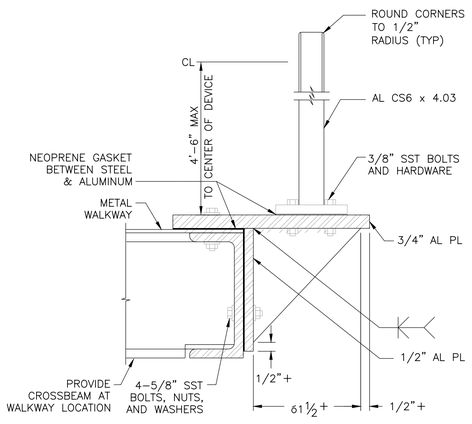


KEY NOTES:

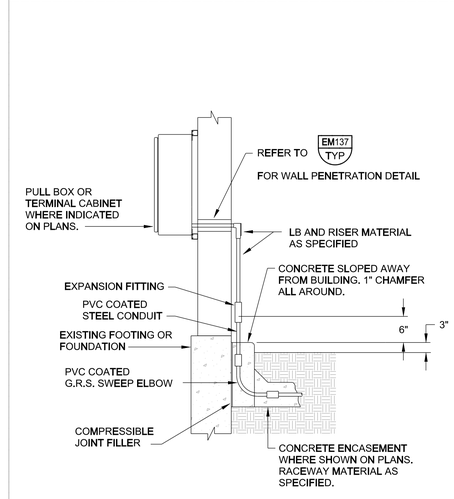
1 REFER TO DUCTBANK AND CONDUIT SCHEDULES FOR CONDUIT REQUIREMENTS.

EM005 TYP S — SAND BEDDED DUCT BANK





EM203 TYP S — DEVICE SUPPORT AND MOUNTING BRACKET ON METAL WALKWAY



EM219 TYP S — CONDUIT PENETRATION ABOVE GRADE

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PROJECT NO. 7880100 FILE NAME: 7880110-00-T-003.dgn

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
DETAILS
ELECTRICAL TYPICAL DETAILS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
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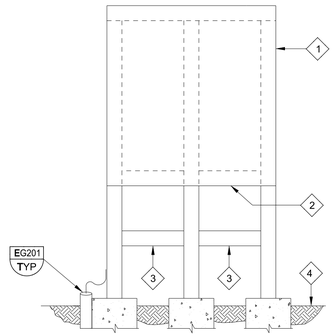
JOB NO. 7880110
DRAWING NO. T-03



KEY NOTES:

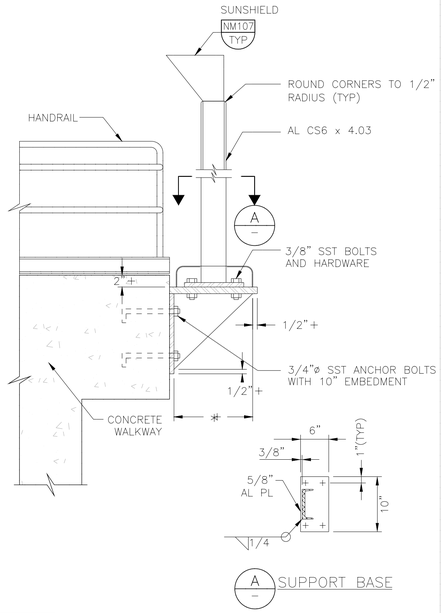
1. FABRICATE SUPPORT STRUCTURE OF SUFFICIENT SIZE TO SAFELY AND ADEQUATELY ACCOMODATE ALL INDICATED ELECTRICAL EQUIPMENT. UTILIZE 4" x 4" GALVANIZED SQUARE TUBING WELDED FRAME. WELD END CAPS ON SQUARE TUBING AS NEEDED. BEVEL EDGES AND REMOVE ALL SHARP EDGES. PRIME AND PAINT WITH A MINIMUM OF 2 COATS EPOXY PAINT.

2. WELD 1/4" STEEL PLATE TO SQUARE TUBING SUPPORT STRUCTURE, FRONT AND BACK. BEVEL EDGES AND REMOVE ALL SHARP EDGES. PAINT AS PER NOTE 1.

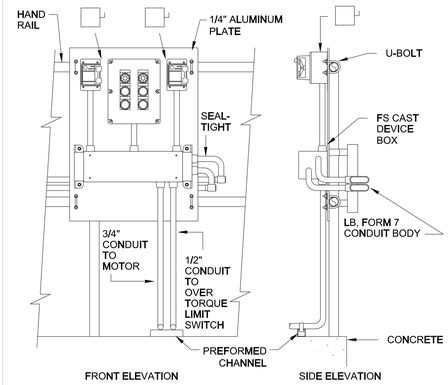
3. CROSS MEMBER FOR CONDUIT BRACING.

4. VERIFY LOCAL SOIL CONDITIONS WHEN FABRICATING CONCRETE PIER. SIZE PIER TO ADEQUATELY AND SAFELY SUPPORT EQUIPMENT STRUCTURE.

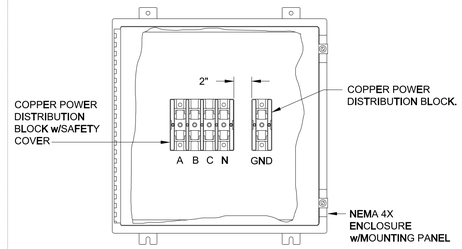
EM230 TYP S — ELECTRICAL EQUIPMENT SUPPORT STRUCTURE



EM340 TYP S — TYPICAL DEVICE SUPPORT AND MOUNTING BRACKET ON CONCRETE WALL



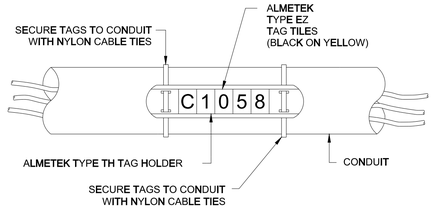
EM450 TYP S — TYPICAL CLARIFIER MOTOR DISCONNECT MOUNTING



NOTES:

1. CONTRACTOR TO SIZE BOX AND POWER BLOCKS SPACING TO CONFORM TO N.E.C. REQUIRMENTS.

EM480 TYP S — TYPICAL POWER J-BOX DETAIL



EN006 TYP S — TYPICAL CONDUIT MARKING SYSTEM

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
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JOB NO. 7880110
DRAWING NO. T-04

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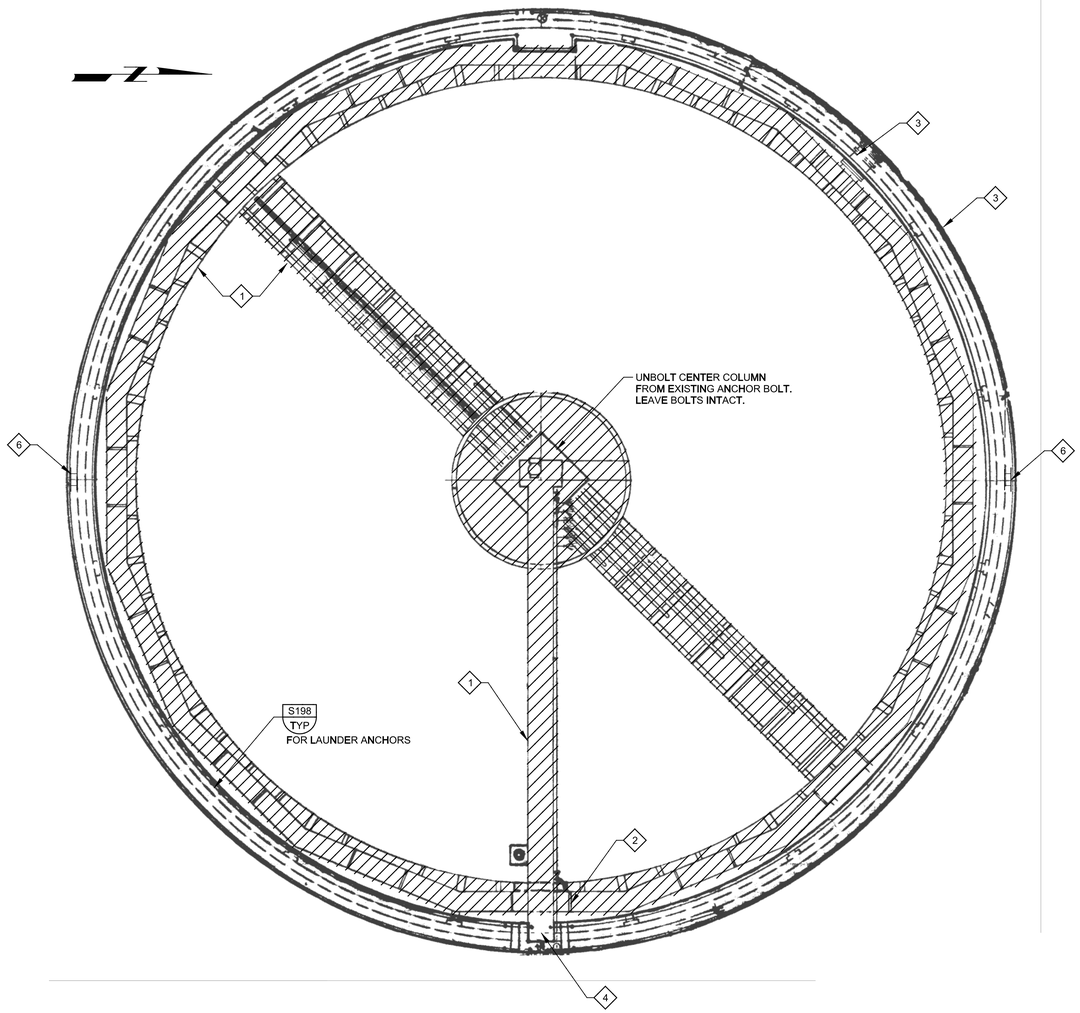
PROJECT NO. 7880100 FILE NAME: 7880110-00-T-004.dgn



A CLARIFIER NO. 1 & 2 DEMOLITION PLAN

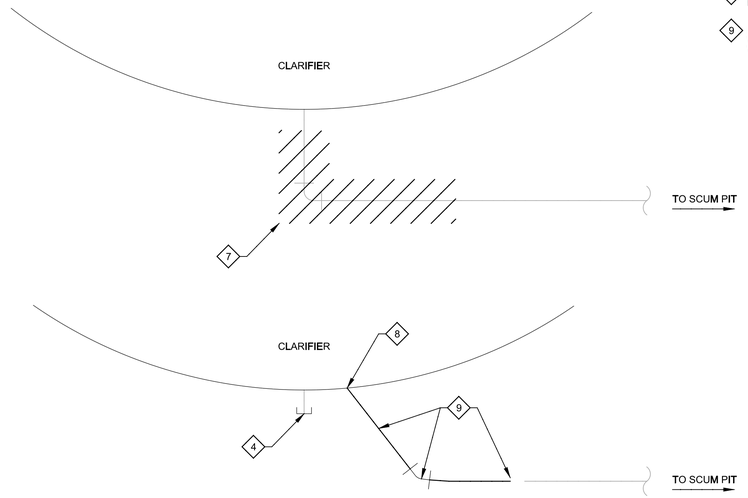
SCALE: 1/8" = 1'-0"
FILE: 7880I10-00-050-100.3DM

GENERAL NOTES:

1. DEMOLITION INSIDE CLARIFIER IS TYPICAL FOR CLARIFIER NO.'S 1 & 2. CUT ALL EXISTING LAUNDER ANCHOR BOLTS FLUSH WITH WALL. EPOXY COAT EXPOSED METAL AND GROUT FILL HOLES.
2. DO NOT DAMAGE OR REMOVE EXISTING CENTER COLUMN ANCHOR BOLTS.
3. CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF DEMOLISHED MATERIAL.

KEY NOTES:

1. REMOVE RAKE ARMS, INFLUENT COLUMN, INFLUENT FEEDWELL, DRIVE PLATFORM AND WALKWAY, DRIVE UNIT, EFFLUENT LAUNDERS AND SUPPORTS, HANDRAIL, CONTROLS, LIGHTING, ELECTRICAL WIRING AND CONDUIT AND PLANT WATER PIPING TO THE LIMITS SHOWN.
2. REMOVE SCUM SKIMMING ARMS, SCUM BOX AND SCUM PIPING TO INSIDE OF TANK WALL.
3. CUT 30" EFFLUENT PIPE FLUSH TO INSIDE OF CLARIFIER WALL.
4. CUT 6" SCUM PIPE FLUSH TO INSIDE OF CLARIFIER WALL. CAP REMAINING PIPE THROUGH OUTSIDE WALL AND FILL WITH GROUT.
5. REMOVE EXISTING WALKWAY AROUND THE PERIMETER OF CLARIFIERS 1 AND 2 AS WELL AS STAIRS AND LIGHT POLES. REPLACE EXISTING WALKWAY AFTER CONSTRUCTION OF NEW LAUNDERS AND CLARIFIER MECHANISMS IS COMPLETE. ANY DAMAGE TO THESE DURING DEMOLITION SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.
6. REMOVE EXISTING HOSE BIB AND RACK AND REPLACE PER DRAWING M-01.
7. REMOVE EXISTING 6" CI SCUM LINE AS REQUIRED FOR CONNECTION TO NEW SCUM OUTLET FROM CLARIFIER.
8. COORDINATE NEW SCUM OUTLET LOCATION WITH CLARIFIER MANUFACTURER.
9. PROVIDE ADDITIONAL FITTINGS AND PIPING AS REQUIRED TO ALIGN WITH EXISTING SCUM PIPING. CONNECT NEW PIPING TO EXISTING WITH COUPLING DRESSER STYLE 38/138 OR EQUAL.



B SCUM PIPING DEMOLITION AND REPLACEMENT

SCALE: N.T.S.
FILE: 7880I10-00-D-001.DGN

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
DEMOLITION
CLARIFIERS 1&2 DEMO PLAN AND SECTIONS

VERIFY SCALES
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JOB NO. 7880I10
DRAWING NO. D-01

LAST SAVED BY: dperry
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-D-001.dgn

GENERAL:

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.

2. UNLESS DETAILED, SPECIFIED, OR INDICATED OTHERWISE, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS ARE MEANT TO APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS.

3. WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF WORK, DETAILS SHALL BE THE SAME AS FOR OTHER SIMILAR WORK.

4. VERIFY LOCATION & SIZE OF OPENINGS AT FLOORS AND WALLS WITH MECHANICAL AND ELECTRICAL PLANS AND AS REQUIRED FOR EQUIPMENT FURNISHED. FOR ADDITIONAL OPENINGS AT FLOORS AND WALLS SEE STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS.

5. CODES:
   BUILDING CODE: BUILDINGS ARE DESIGNED IN ACCORDANCE WITH THE 2007
   EDITION OF THE FLORIDA BUILDING CODE WITH 2009
   SUPPLEMENT, FLOWING ALL APPLICABLE PROVISIONS FOR
   ALL PHASES OF CONSTRUCTION.
   REINFORCED CONCRETE: AMERICAN CONCRETE INSTITUTE ACI 318-05

6. LOADING CRITERIA:
   MINIMUM LOADING REQUIREMENTS PER ASCE 7-02

   DEAD LOAD . . . . . CALCULATED

   LIVE LOADS . . . . . SEE PLANS

   LATERAL EARTH PRESSURE AND ALLOWABLE BEARING PRESSURE
   PER SOILS REPORT.

   LATERAL SURCHARGE . . . . . EQUIVALENT TO 2 FT OF SOIL

   HYDROSTATIC FLUID PRESSURE . . . . . 63 PSF/FT

   WIND LOAD:
   BASIC WIND SPEED . . . . . 130 MPH (3 SECOND GUST)
   EXPOSURE C
   IMPORTANCE FACTOR 1.0
   CATEGORY II
   INTERNAL PRESSURE COEFFICIENT . . .±0.18 (ENCLOSED WITH PROTECTED OPENINGS)

   SEISMIC LOAD:
   Sds = .069
   Sd1 = .044
   I = 1.5

7. CONSTRUCTION LOADS:
   STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON COMPLETED STRUCTURES. DURING CONSTRUCTION, STRUCTURES SHALL BE PROTECTED BY BRACING AND BALANCING WHEREVER EXCESSIVE LOADS MAY OCCUR.

8. INSERTS AND SLEEVES FOR PIPES, ETC. AND EMBEDDED ITEMS SUCH AS CONDUITS ARE SHOWN IN MECHANICAL AND ELECTRICAL DRAWINGS.

9. WHERE LIFTING LUGS ARE CALLED FOR ON THE PLANS, CONTRACTOR SHALL PROVIDE A DETAIL AND CALCULATIONS FOR A REMOVABLE EYE, FOR REVIEW AND APPROVAL BY THE ENGINEER. REMOVABLE EYE SHALL BE TURNED OVER TO THE OWNER AFTER INSTALLATION OF MOVABLE PANELS.

ALUMINUM:

1. ALUMINUM CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE ALUMINUM MANUAL OF THE ALUMINUM ASSOCIATION.

2. UNLESS OTHERWISE NOTED, STRUCTURAL ALUMINUM SHALL BE ALLOY 6061-T6 AS SPECIFIED IN ASTM B211 OR ASTM B221 FOR BARS, AND ASTM B308 FOR STRUCTURAL SHAPES.

3. WHERE ALUMINUM IS IN CONTACT WITH MASONRY OR CONCRETE SURFACES, CONTACT SURFACES SHALL BE COATED WITH EPOXY COATING.

4. EACH BOLTED CONNECTION SHALL HAVE MINIMUM OF TWO BOLTS.

5. BOLT SPACING SHALL BE 3 INCHES, UNO.

CONCRETE:

1. ALL CONCRETE STRENGTH SHALL BE 4,000 PSI MINIMUM AT 28 DAYS UNO.

2. LOCATION OF CONSTRUCTION JOINTS SHALL BE APPROVED BY THE ENGINEER. IF NOT SHOWN ON DRAWINGS, CONSTRUCTION JOINTS SHALL BE ROUGH AND CLEAN. REMOVE LOOSE AGGREGATE AND DAMAGED CONCRETE.

3. PROVIDE 3/4 INCH CHAMFERS AT ALL EXPOSED EDGES UNO.

4. FOR ADDITIONAL CONCRETE NOTES SEE S101 TYP

REINFORCING STEEL:

1. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM SPECIFICATION A615 GRADE 60.

2. PROVIDE SPACER BARS, SPREADERS, CHAIRS, BLOCKS, ETC., AS REQUIRED TO SECURELY HOLD STEEL IN PLACE.

3. MAINTAIN 3 INCHES MINIMUM CLEARANCE BETWEEN REINFORCING STEEL AND PIPELINES UNLESS OTHERWISE NOTED.

4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.

5. NO WELDING OF REINFORCEMENT BARS SHALL BE PERMITTED UNLESS APPROVAL IS OBTAINED FROM THE ENGINEER PRIOR TO CONSTRUCTION.

6. ALL REINFORCING STEEL SHALL BE LAP SPLICED PER S101 TYP ALL BARS

   SHALL BE DEVELOPED BEYOND POINT OF TERMINATION, AS SHOWN ON DRAWINGS. IF DEVELOPMENT LENGTH IS NOT SHOWN, WHETHER HOOKED OR STRAIGHT, DEVELOPMENT LENGTH SHALL BE PER ACI 318-02.

STEEL AND STAINLESS STEEL:

1. ALL MATERIAL AND WORK SHALL CONFORM TO THE AISC SPECIFICATION, LATEST EDITION, FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS.

2. STRUCTURAL STEEL ROLLED SHAPES SHALL CONFORM TO ASTM A992 GRADE 50.

3. STRUCTURAL PIPE MEMBERS SHALL CONFORM TO ASTM A53, GRADE B.

4. STRUCTURAL TUBE MEMBERS SHALL CONFORM TO ASTM A-500, GRADE B, FY=46 KSI.

5. STRUCTURAL STAINLESS STEEL SHALL CONFORM TO ASTM A276 FOR BARS AND SHAPES, TYPE 316L, INCLUDING ALL CONNECTORS ETC.

6. UNLESS DETAILED OTHERWISE, ALL CONNECTIONS SHALL BE MADE WITH 3/4 INCH DIAMETER HIGH STRENGTH BOLTS. HIGH STRENGTH BOLTS SHALL CONFORM TO A325SC UNLESS NOTED OTHERWISE.

7. EACH CONNECTION SHALL HAVE A MINIMUM OF TWO BOLTS.

8. BOLT SPACING SHALL BE 3 INCHES, UNLESS NOTED OTHERWISE.

9. MINIMUM EDGE DISTANCE (DISTANCE FROM CENTER OF BOLT TO NEAREST EDGE OF PLATE OR STRUCTURAL ELEMENT) SHALL BE 1 1/2 INCHES FOR 3/4 INCH DIAMETER BOLTS UNLESS NOTED OTHERWISE.

10. ANCHOR BOLTS SHALL BE PER ASTM A307, UNO.

11. ALL BOLTED STAINLESS STEEL CONNECTIONS SHALL CONSIST OF STAINLESS STEEL BOLTS, NUTS, AND WASHERS.

WELDING STEEL:

1. WELDING SHALL BE DONE BY ELECTRIC SHIELDED ARC PROCESS USING E-70XX ELECTRODES.

2. ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS.

3. ALL WELDS SHALL BE MADE IN CONFORMANCE WITH THE LATEST EDITION OF THE STRUCTURAL WELDING CODE AWS A5.1 AND AWS D1.1 OF THE AMERICAN WELDING SOCIETY.

4. ALL FILLET WELDS SHALL BE A MINIMUM 3/16 INCH, IF NOT CALLED OUT.

WELDING ALUMINUM:

1. WELDING ALUMINUM SHALL BE IN CONFORMANCE WITH AWS D1.2-90

2. WELDING SHALL BE DONE BY USING ER4043 ELECTRODES.

3. ALL WELDING SHALL BE CONTINUOUS AND SHALL BE 3/16" FILLET WELDS, UNO.

4. CONTINUOUS INSPECTION IS REQUIRED FOR WELDING OF STRUCTURAL ALUMINUM.

WELDING STAINLESS STEEL:

1. WELDING SHALL BE DONE BY USING E316L-15 ELECTRODES FOR ASTM316L.

2. SEE NOTE 4 UNDER WELDING STEEL.

3. WELD PER AWS B2.1 OR D10.4 AS APPLICABLE.

ADDITIONAL ABBREVIATIONS:

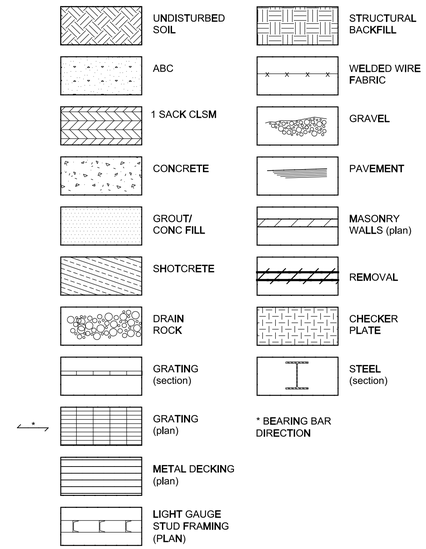
H1E HOOK ONE END
H2E HOOK TWO ENDS
HAS HEADED ANCHOR STUD

SPECIAL INSPECTION:

SPECIAL INSPECTION OF THE FOLLOWING ITEMS SHALL BE IN ACCORDANCE WITH FLORIDA BUILDING CODE 2004.

SPECIAL INSPECTION SHALL BE PROVIDED FOR ALL STRUCTURAL LOAD BEARING COMPONENTS IN ADDITION TO THE INSPECTIONS CONDUCTED BY THE DEPARTMENT OF BUILDING SAFETY AND SHALL NOT BE CONSTRUED TO RELIEVE THE OWNER OR HIS AUTHORIZED AGENT FROM REQUESTING THE PERIODIC AND CALLED FOR INSPECTIONS REQUIRED BY SECTION 109 OF THE FLORIDA BUILDING CODE 2004.

ARCH/STRUCT HATCH PATTERNS:



REV	DATE	BY	DESCRIPTION

DESIGNED JS
DRAWN DVP
CHECKED EP
DATE JULY 2011

carollo

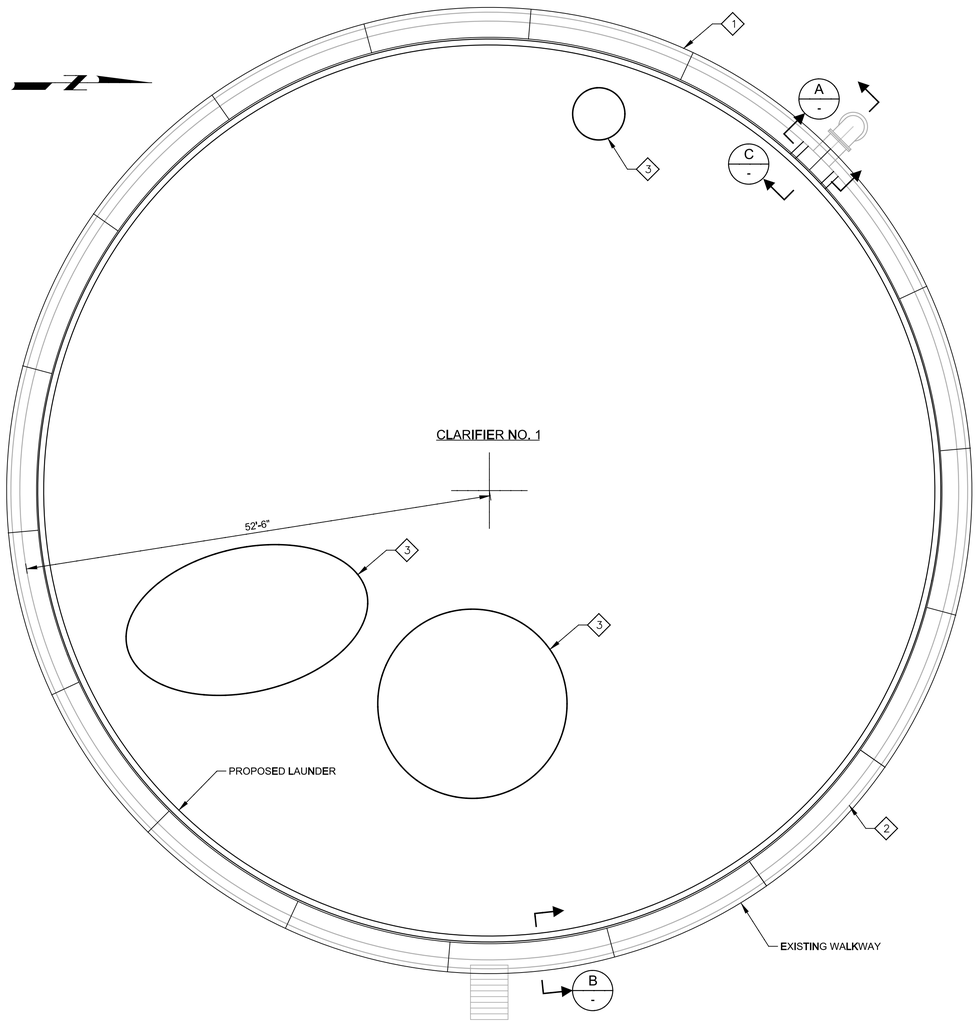
MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
STRUCTURAL
GENERAL NOTES AND ABBREVIATIONS

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

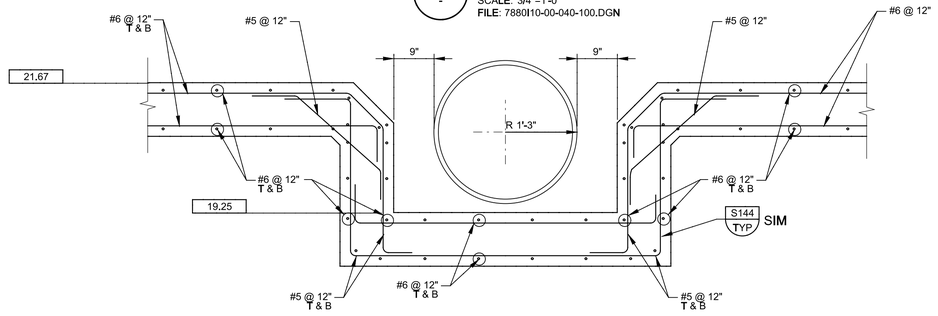
JOB NO. 7880I10
DRAWING NO. S-01

LAST SAVED BY: dperry

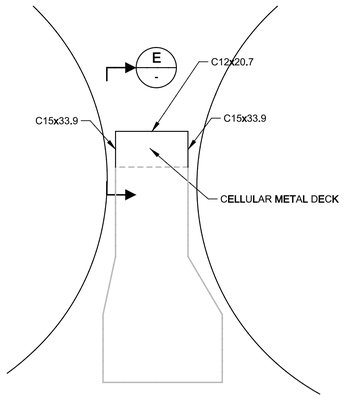
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-S-001.dgn



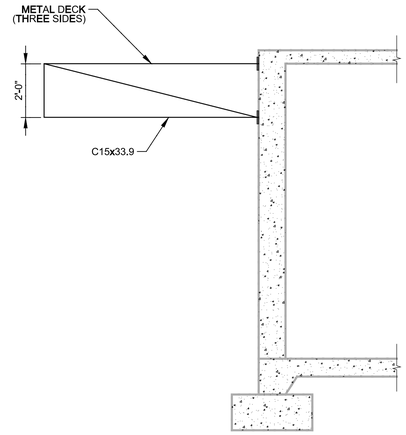
A PLAN
SCALE: 3/4"=1'-0"
FILE: 7880I10-00-040-100.DGN



A SECTION
SCALE: 3/4"=1'-0"
FILE: 7880I10-00-040-100.DGN



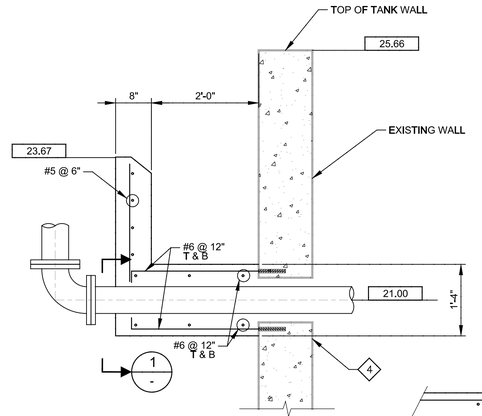
D PUMP BUILDING ROOF PLAN
SCALE: 1/16"=1'-0"
FILE: 7880I10-00-040-100.DGN



E PUMP BUILDING ROOF SECTION
SCALE: 3/8"=1'-0"
FILE: 7880I10-00-040-100.DGN

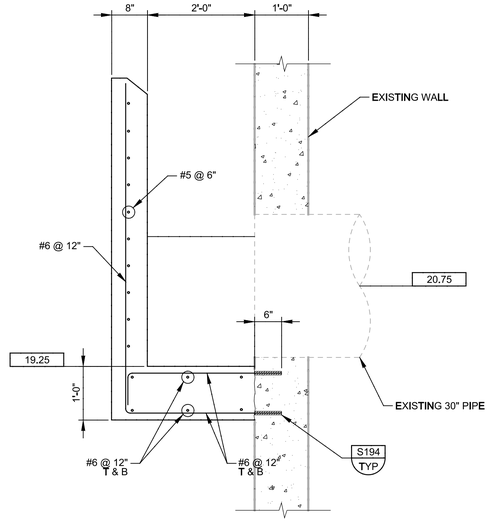
GENERAL NOTES:
1. PLAN AND SECTIONS SHOWN ARE TYPICAL FOR CLARIFIER NO.1 AND NO. 2
2. CONTRACTOR MUST FIELD VERIFY PIPE ELEVATION.
3. COAT INSIDE OF TANK AND LAUNDER PER SPECIFICATION 09960.
4. PAINT EXPOSED EXTERIOR TANK WALLS PER SPECIFICATION 09960.

KEY NOTES:
1. EXISTING PERIMETER WALKWAY NOT SHOWN FOR CLARITY.
2. PAINT EXPOSED EXTERIOR WALLS OF CLARIFIERS 1&2.
3. REPAIR DELAMINATED AND MISSING GROUT ACCORDING TO DIVISION 3 (CLARIFIER 2 ONLY) AREAS AND LOCATIONS ARE APPROXIMATE.
4. CORE DRILL PER P301 / TYP .



1 SECTION
SCALE: 3/4"=1'-0"
FILE: 7880I10-00-040-100.DGN

B LAUNDER SECTION
SCALE: 3/4"=1'-0"
FILE: 7880I10-00-040-100.DGN



C LAUNDER DROP BOX SECTION
SCALE: 3/4"=1'-0"
FILE: 7880I10-00-040-100.DGN

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DATE JULY 2011

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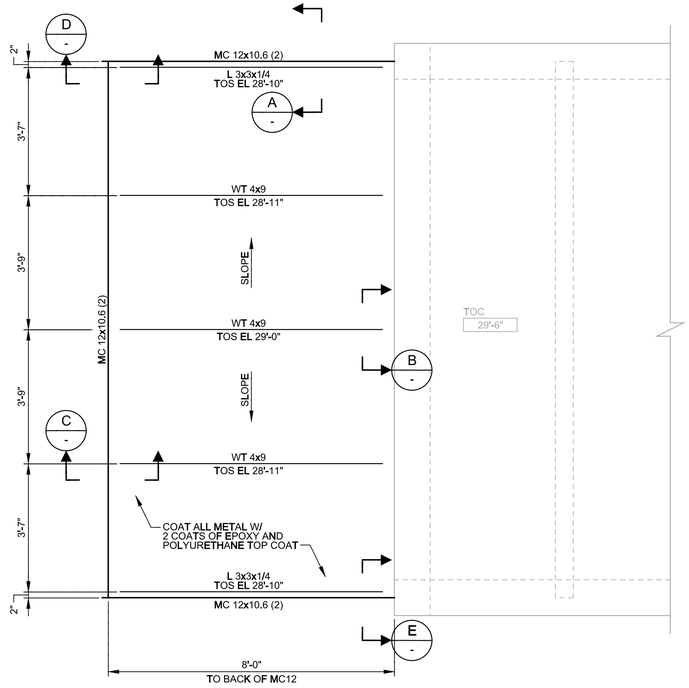
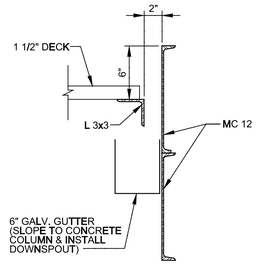
MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
STRUCTURAL
CLARIFIERS 1 & 2 PLAN AND SECTIONS

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

JOB NO. 7880I10
DRAWING NO. S-02

LAST SAVED BY: dperry
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-S-002.dgn





A - SECTION
SCALE: 1 1/2" = 1'-0"
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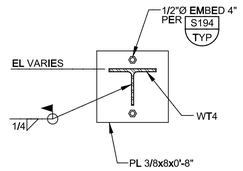

B - SECTION
SCALE: 1 1/2" = 1'-0"
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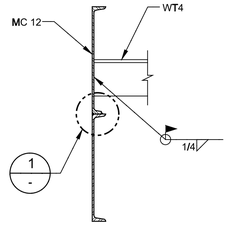
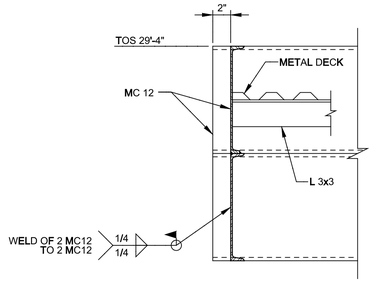


C - SECTION
SCALE: 1 1/2" = 1'-0"
FILE: 7880I10-00-040-100.DGN



D - SECTION
SCALE: 1 1/2" = 1'-0"
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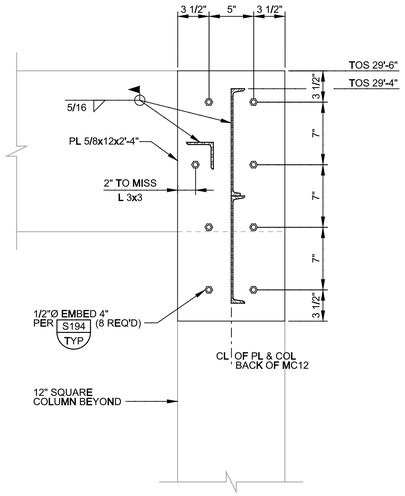

E - SECTION
SCALE: 1 1/2" = 1'-0"
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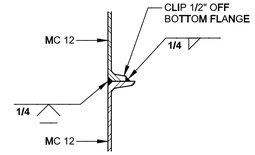


ALL WELDS SHALL BE SEAL WELDS

1 - DETAIL
SCALE: 3" = 1'-0"
FILE: 7880I10-00-040-100.DGN

GENERAL NOTES:

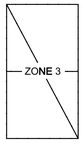
1. PLAN AND SECTIONS SHOWN ARE TYPICAL FOR CLARIFIER NO.1 AND NO. 2
2. CONTRACTOR MUST FIELD VERIFY PIPE ELEVATION.
3. COAT INSIDE OF TANK AND LAUNDER PER SPECIFICATION 09960.
4. PAINT EXPOSED EXTERIOR TANK WALLS PER SPECIFICATION 09960.

KEY NOTES:

1. EXISTING PERIMETER WALKWAY NOT SHOWN FOR CLARITY.
2. PAINT EXPOSED EXTERIOR WALLS OF CLARIFIERS 1&2.
3. REPAIR DELAMINATED AND MISSING GROUT ACCORDING TO DIVISION 3 (CLARIFIER 2 ONLY) AREAS AND LOCATIONS ARE APPROXIMATE.
4. CORE DRILL PER P301 TYP .

COMPONENT AND CLADDING LOADS

EFFECTIVE WIND AREA	UPWARD LOADS	DOWNWARD LOADS
< 9 FT^2	102 PSF	26.6 PSF
9 FT^2 TO 36 FT^2	51.4 PSF	21.3 PSF
> 36 FT^2	31.1 PSF	13.3 PSF



SHADE CANOPY PLAN

SCALE: 1/2"=1'-0"
FILE: 7880I10-00-040-100.DGN

LL = 20 PSF
SEE WIND LOADS

LAST SAVED BY: dperry

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CHECKED EP
DATE JULY 2011

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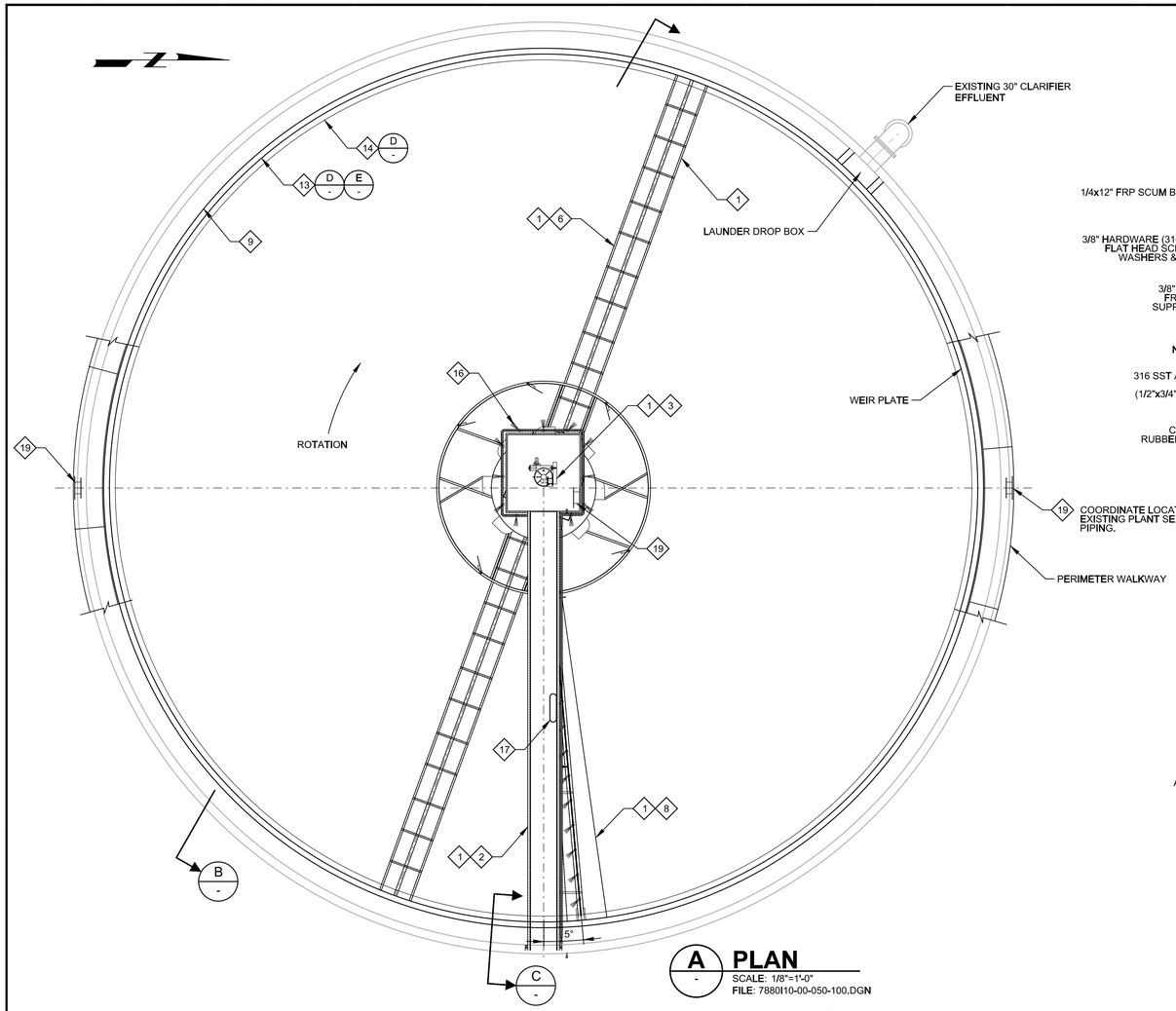
MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
STRUCTURAL
SHADE CANOPY PLAN AND SECTIONS

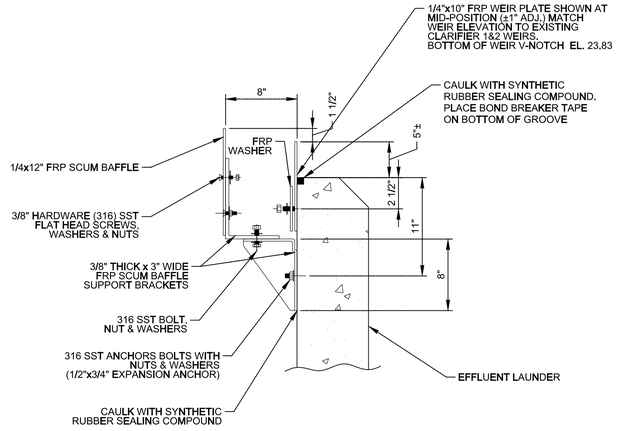
VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 7880I10
DRAWING NO. S-03

PROJECT NO. 7880I00 FILE NAME: 7880I10-00-S-003.dgn



A PLAN
SCALE: 1/8"=1'-0"
FILE: 7880I10-00-050-100.DGN



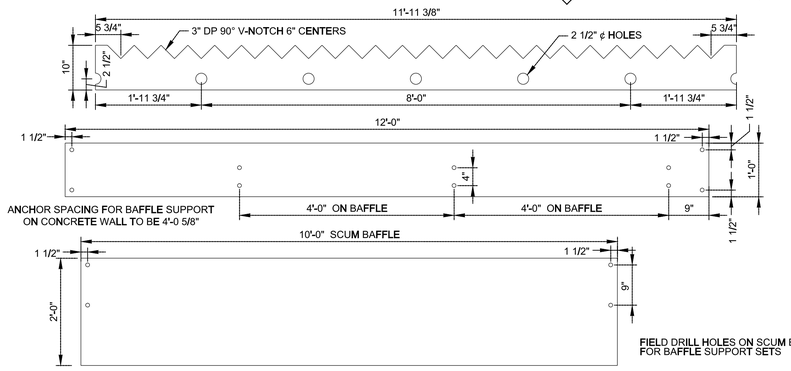
D TYPICAL WEIR SECTION
SCALE: 1 1/2"=1'-0"
FILE: 7880I10-00-050-100.DGN

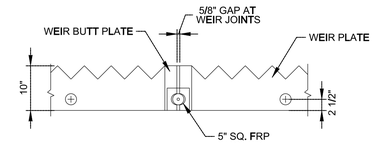
KEY NOTES:

1. ALL EQUIPMENT TO BE PROVIDED BY CLARIFIER MANUFACTURER UNLESS OTHERWISE NOTED. SEE SPECIFICATIONS 11353 FOR MATERIALS AND DIMENSIONS.
2. 3' WALKWAY.
3. CLARIFIER DRIVE AND PLATFORM.
4. INFLUENT FEEDWELL W/SCUM PORTS.
5. CENTER INFLUENT COLUMN.
6. RAKE ARM.
7. SLUDGE DRAW-OFF PIPES
8. FULL RADIUS LENGTH SCUM TROUGH
9. NEW EFFLUENT LAUNDER.
10. SKIMMER ARM (TYP. OF 2).
11. INSTALL 6" SCUM PIPE PER P301 TYP AND B S-02.
12. NEW CLARIFIER BRIDGE SHALL MATCH ELEVATION OF CURRENT BRIDGE. IF NECESSARY, ADD CONCRETE OR OTHER MATERIAL TO STRUCTURALLY SUPPORT THE NEW CLARIFIER BRIDGE. MANUFACTURER SHALL PROVIDE NECESSARY DETAILS FOR SUPPORTING CLARIFIER BRIDGE FROM TANK WALL. CONTRACTOR MUST COORDINATE ANY STRUCTURAL SUPPORT ON TANK WALL WITH EXISTING STAIRS AND LANDING WHICH LEADS TO THE CLARIFIER BRIDGE.
13. V-NOTCH WEIR
14. SCUM BAFFLE
15. DENSITY CURRENT BAFFLE TO BE SUPPLIED BY CLARIFIER MANUFACTURER. FIELD TRIM AS REQUIRED AT SCUM TROUGH.
16. REPAIR WALL (CLARIFIER 1 ONLY) AT WALKWAY.
17. LIFE RING,ROPE AND CABINET AS MANUFACTURED BY CHEYENNE MANUFACTURING, INC. MOUNT TO HANDRAIL.
18. CONNECT TO EXISTING 6" SCUM PIPING.
19. HOSE BIB AND RACK PER M276 TYP, M280 TYP. MOUNTED ON HANDRAIL.
20. SPRAY NOZZLE RING. 11 NOZZLES WITH 3/4" DIA. PIPING SPACED AS REQUIRED
21. PROVIDE PIPE FLANGE INSULATION PER D062 TYP.
22. SCUM TROUGH SPRAY. 13 NOZZLES WITH 3/4" DIA. PIPING AT 2'-6" SPACING.

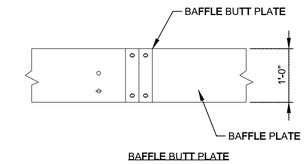
GENERAL NOTES:

1. DRAWING IS SHOWN FOR CLARIFIER NO. 1. CLARIFIER NO. 2 IS THE SAME (OPPOSITE HAND).
2. REINSTALL CLARIFIER PERIMETER WALKWAY AT PREVIOUS ELEVATION.
3. CONTRACTOR SHALL CONNECT EXISTING PLANT WATER PIPING TO SPRAY SYSTEM FOR CLARIFIER.



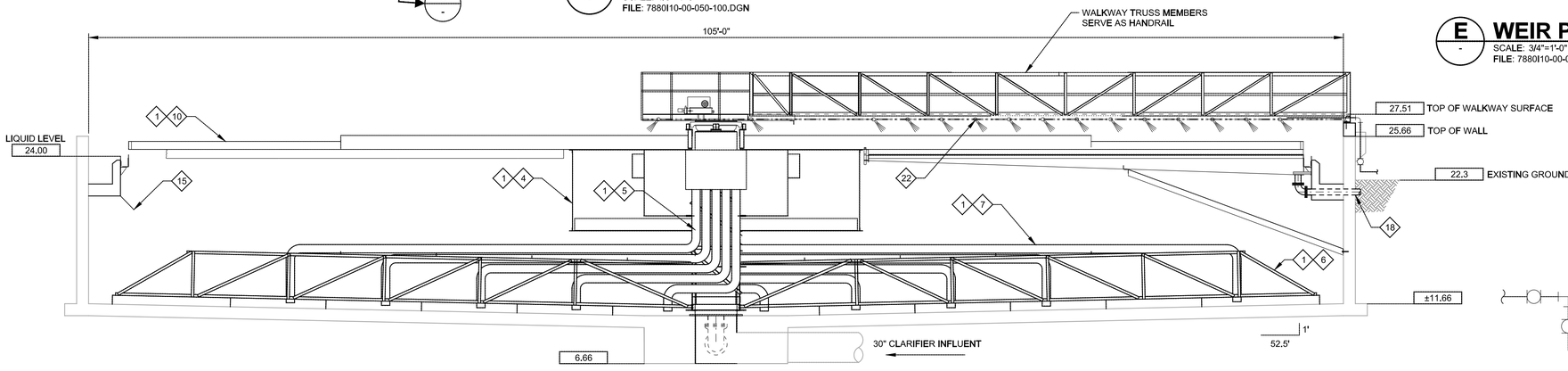


WEIR BUTT PLATE

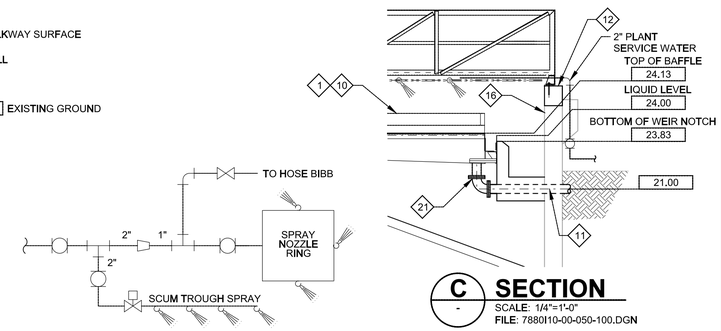


BAFFLE BUTT PLATE

E WEIR PLATE AND SCUM BAFFLE DETAIL
SCALE: 3/4"=1'-0"
FILE: 7880I10-00-050-100.DGN



B SECTION
SCALE: 3/16"=1'-0"
FILE: 7880I10-00-050-100.DGN



C SECTION
SCALE: 1/4"=1'-0"
FILE: 7880I10-00-050-100.DGN

F CLARIFIER PLANT WATER SCHEMATIC
SCALE: N.T.S.
FILE: 7880I10-00-M-001.DGN

REV	DATE	BY	DESCRIPTION

DESIGNED EP
DRAWN DVP
CHECKED EP
DATE JULY 2011

carollo

MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
MECHANICAL
CLARIFIERS 1&2 PLAN AND SECTIONS

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

JOB NO. 7880I10
DRAWING NO. M-01

LAST SAVED BY: dperry
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-M-001.dgn

ELECTRICAL PLAN SYMBOLS

IDENTIFICATION SYMBOLS

EQUIPMENT IDENTIFICATION

INSTRUMENT IDENTIFICATION

EQUIPMENT/INSTRUMENT LOCATOR

a (X) b / c — LUMINAIRE IDENTIFICATION
a = DEVICE SWITCHED FROM
b = CIRCUIT DESIGNATION
c = MOUNTING HEIGHT IN FEET TO BOTTOM OF FIXTURE

XXXX — CONDUIT IDENTIFICATION
XXXX = CONDUIT NUMBER.
REFER TO CONDUIT SCHEDULE

1 — INDICATES KEYNOTE 1
(PERTAINS ONLY TO SHEET WHERE NOTE IS FOUND)

OPERATOR INTERFACE STATION
1 = STATION TYPE

EQUIPMENT ENCLOSURE

GROUNDING

UNDERGROUND GROUND GRID #4/0 SDBC
UNLESS OTHERWISE NOTED

GROUND ROD

GROUND ROD AND GROUND WELL

COMPRESSION OR EXOTHERMIC
GROUNDING CONNECTION

LUMINAIRES

2', 4', OR 8' FLUORESCENT STRIP

2' X 2' LAY-IN TROFFER
REFER TO LUMINAIRE SCHEDULE

2' X 4' LAY-IN TROFFER
REFER TO LUMINAIRE SCHEDULE

LUMINAIRE POLE MOUNTED

STROBE
a = COLOR
R = RED
G = GREEN
A = AMBER

LUMINAIRE, EMERGENCY BATTERY-POWERED

LUMINAIRE, EMERGENCY/EXIT BATTERY-POWERED

LUMINAIRE, EMERGENCY BATTERY-POWERED REMOTE

LUMINAIRE, SURFACE OR PENDANT MOUNTED

LUMINAIRE, WALL MOUNTED

LUMINAIRE, FLOOD/SPOT

LUMINAIRE, EXIT ONE OR TWO FACES AS INDICATED.
ARROW POINTS IN DIRECTION OF EGRESS.

LUMINAIRE, WALL WASHER

SWITCHES/RECEPTACLES

a S b — SINGLE POLE SWITCH
a = DEVICE SWITCHED DESIGNATION
b = CIRCUIT DESIGNATION

a S b / c — IF c =
2 = DOUBLE POLE SWITCH
3 = THREE-WAY SWITCH
4 = FOUR-WAY SWITCH
K = KEY OPERATED SWITCH
F = SWITCH AND FUSESTAT HOLDER
P = SWITCH AND PILOT LIGHT
T = THERMOSTAT
D = DIMMER SWITCH
L = LOW VOLTAGE LIGHT SWITCH
M = MANUAL MOTOR STARTER

a / b — OCCUPANCY SENSOR
a = CIRCUIT DESIGNATION
b = DEVICE SWITCHED DESIGNATION

a S b — SWITCH AND SINGLE RECEPTACLE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION
S = SWITCH AND SINGLE RECEPTACLE

a / b — DUPLEX RECEPTACLE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION

a / b — QUADRUPLEX RECEPTACLE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION

a / b — IN FLOOR DUPLEX RECEPTACLE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION

a / b — IN FLOOR QUADRUPLEX RECEPTACLE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION

a / b — DUPLEX RECEPTACLE w/SPLIT WIRE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION

a / b — WELDING OR APPLIANCE RECEPTACLE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION

a / b — WELDING RECEPTACLE
a = CIRCUIT DESIGNATION
b = DISCONNECT TYPE

a / b — SPECIAL PURPOSE RECEPTACLE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION

C a — CLOCK RECEPTACLE
a = MOUNTING HEIGHT

F a — FAN RECEPTACLE
a = MOUNTING HEIGHT

a — TWIST LOCK RECEPTACLE
a = AMP RATING

a / b — TELEPHONE OUTLET
a = MOUNTING HEIGHT

a / b — DATA COMMUNICATIONS OUTLET
a = MOUNTING HEIGHT

a — DISCONNECT SWITCH
a = TYPE, REFER TO DISCONNECT SCHEDULE

PE — PHOTOCELL

d / a — SMOKE DETECTOR
a = TYPE
I = IONIZATION
P = PHOTOELECTRIC
d = DUCT DETECTOR

FACP — FIRE ALARM CONTROL PANEL

F — FIRE ALARM PULL STATION

F — FIRE ALARM HORN/STROBE COMBINATION

F — FIRE ALARM STROBE

F — FIRE SPRINKLER
F = FLOW SWITCH
T = TAMPER SWITCH

RACEWAY

EXPOSED CONDUIT

INDICATES BREAK IN CONDUIT RUN

EXPOSED CONDUIT HIDDEN BEHIND WALLS,
FLOORS OR OTHER STRUCTURES

UNDERGROUND CONDUIT, DIRECT BURIED
OR IN DUCTBANK

CONDUIT IN SLAB

CONDUIT VERTICAL CHANGE IN DIRECTION

J — JUNCTION BOX

CONDUIT SEAL

DUCTBANK
APPROXIMATE DIMENSIONS
SHOWN ON DUCTBANK SCHEDULE

CONDUIT SIZE AND CONDUCTORS

INDIVIDUAL CONDUCTORS

W"C-(3-X (Ø), 1-#Y (N) & 1-Z (G))

W"C (WHERE INDICATED): W = CONDUIT TRADE SIZE

3-X TYPE (Ø):
3 = QUANTITY
X = SIZE OF CONDUCTORS
(Ø) = DESIGNATES PHASE CONDUCTORS

1-Y TYPE (N)(WHERE INDICATED):
1 = QUANTITY
Y = SIZE OF CONDUCTORS
(N) = DESIGNATES NEUTRAL CONDUCTORS

1-Z TYPE (G)(WHERE INDICATED):
1 = QUANTITY
Z = SIZE OF CONDUCTORS
(G) = DESIGNATES GROUND CONDUCTORS

U(3-X TYPE (Ø) & 1-X TYPE (G))}
U = NUMBER OF PARALLEL RUNS

MULTI CONDUCTOR CABLES

K/2/C#16S
K (WHERE INDICATED) = NUMBER OF PAIRS
2/C#16S = TWO CONDUCTOR, 16 GAUGE, TWISTED SHIELDED PAIR

K/3/C#16S
K (WHERE INDICATED) = NUMBER OF TRIPLETS
3/C#16S = THREE CONDUCTOR, 16 GAUGE, TWISTED SHIELDED TRIPLETS

N/CX TYPE
N = NUMBER OF CONDUCTORS IN THE CABLE
X = SIZE OF CONDUTORS

FIBER OPTIC CABLES

FO/N
N = NUMBER OF INDIVIDUAL FIBERS

ELECTRICAL ONE-LINE SYMBOLS

LOW VOLTAGE

b c d / e a f — LOW VOLTAGE CIRCUIT BREAKER
a = TYPE
MCP = MOTOR CIRCUIT PROTECTOR
TM = THERMAL MAGNETIC
SS = SOLID STATE
b = FRAME SIZE (MANUFACTURER TO DETERMINE FRAME SIZE UNLESS INDICATED)
c = NUMBER OF POLES
d = TRIP SETTING (AT = AMP TRIP)
(AC = MCP CONTINUOUS RATING)
e = DESIGNATION
f = INTERRUPTING RATING

LOW VOLTAGE CIRCUIT BREAKER
AUXILIARY OPERATOR
* = S = SHUNT TRIP
= K = KIRK KEY INTERLOCK
= G = GROUND FAULT INTERRUPTER
= V = SOLENOID KEY RELEASE

a — DISCONNECT SWITCH
a = TYPE, REFER TO DISCONNECT SCHEDULE

a / b — FUSED DISCONNECT SWITCH
a = TYPE, REFER TO DISCONNECT SCHEDULE
b = FUSE RATING

FUSE

a / b / c — COMBINATION STARTER
WITH CONTROL POWER TRANSFORMER
a = CIRCUIT BREAKER DISCONNECT, TYPE AS NOTED
b = STARTER TYPE
c = NEMA STARTER SIZE
d = OVERLOAD HEATERS

MISCELLANEOUS

HP — MOTOR
HP = HORSEPOWER RATING
FULL LOAD AMPS AS NOTED

a / b — PACKAGED EQUIPMENT
LOAD RATING AS INDICATED
a = RATED LOAD
b = UNIT(HP, KW, KVA) AS INDICATED

f / g / a b c d e h — TRANSFORMER
a = DEVICE I.D.
b = KVA RATING
c = NUMBER OF PHASES
d = PRIMARY VOLTAGE
e = SECONDARY VOLTAGE
f,g = CONNECTION TYPE SYMBOL
h = IMPEDANCE

GROUNDED WYE CONNECTION

DELTA CONNECTION

a / b / c / d / e — G — ENGINE-GENERATOR RATINGS AS INDICATED ON THE DRAWINGS
a = KVA/KW
b = VOLTAGE/CONNECTION
c = PHASE
d = WIRE
e = pf

a / b — CURRENT TRANSFORMER WITH SHORTING TERMINAL BLOCK
a = QUANTITY
b = RATIO

c a d / b — POTENTIAL TRANSFORMER
a = QUANTITY
b = RATIO
c,d = CONNECTION TYPE SYMBOL

SSM — SOLID STATE MULTIFUNCTION METER

ATP — AMPERE TEST POINT

VTP — VOLTAGE TEST POINT

UTILITY METER

LIGHTNING ARRESTER

SPD — SURGE PROTECTIVE DEVICE

DRAWOUT CONNECTION

GROUND

CAPACITOR

BATTERY

K — KIRK KEY INTERLOCK

REV	DATE	BY	DESCRIPTION

DESIGNED MAG
DRAWN DVP
CHECKED EP
DATE JULY 2011

carollo

MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
SYMBOL LEGEND

VERIFY SCALES
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0 — 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 7880I10
DRAWING NO. E-01

LAST SAVED BY: dperry
PROJECT NO. 7880I00
FILE NAME: 7880I10-00-E-001.dgn

PROCESS SWITCHES

- FLOAT SWITCH CLOSE ON RISING LEVEL
- FLOAT SWITCH OPEN ON RISING LEVEL
- PRESSURE SWITCH CLOSE ON RISING PRESSURE
- PRESSURE SWITCH OPEN ON RISING PRESSURE
- TEMPERATURE SWITCH CLOSE ON RISING TEMPERATURE
- TEMPERATURE SWITCH OPEN ON RISING TEMPERATURE
- FLOW SWITCH CLOSE ON INCREASE IN FLOW
- FLOW SWITCH OPEN ON INCREASE IN FLOW
- VIBRATION SWITCH OPEN ON RISING VIBRATION
- VIBRATION SWITCH CLOSE ON RISING VIBRATION
- TORQUE SWITCH OPEN ON HIGH TORQUE
- TORQUE SWITCH CLOSE ON HIGH TORQUE
- N.C. LIMIT SWITCH
- N.C. HELD OPEN LIMIT SWITCH
- N.O. LIMIT SWITCH
- N.O. HELD CLOSED LIMIT SWITCH

HAND SWITCHES

- N.O. MOMENTARY PUSHBUTTON
- N.C. MOMENTARY PUSHBUTTON
- THREE POSITION SELECTOR SWITCH (xoo) x - DENOTES POSITION CONTACTS CLOSED IN
- TWO POSITION SELECTOR SWITCH (xo) x - DENOTES POSITION CONTACTS CLOSED IN
- MUSHROOM HEAD PUSHBUTTON
- PUSH-PULL PUSHBUTTON MAINTAINED CONTACT
- PADLOCK SWITCH (xox) x - DENOTES POSITION CONTACTS CLOSED IN
- PULL CORD SWITCH
- STOP-LOCKOUT PUSHBUTTON
- SPRING-RETURN (xoo) x - DENOTES POSITION CONTACTS CLOSED IN

PILOT LIGHTS

- PILOT LIGHT
  a = LENS COLOR
  R = RED
  G = GREEN
  W = WHITE
  A = AMBER

RELAYS

- RELAY COIL (a = TYPE)
  - CR - CONTROL RELAY
  - TD - TIME DELAY RELAY
  - M - MOTOR STARTER COIL
  - L - MOTOR STARTER COIL - LOW SPEED
  - H - MOTOR STARTER COIL - HIGH SPEED
  - F - MOTOR STARTER COIL - FORWARD
  - R - MOTOR STARTER COIL - REVERSE
- b = TDON - TIME DELAY ON ENERGIZATION; TDOFF - TIME DELAY ON DEENERGIZATION
- c = TIMING RANGE/SETTING
- d = DESCRIPTION
- N.O. CONTROL CONTACT
- N.C. CONTROL CONTACT
- NOTC TIME DELAY SWITCH N.O. DELAY CLOSING
- NCTO TIME DELAY SWITCH N.C. DELAY OPENING
- NOTO TIME DELAY SWITCH N.O. DELAY OPENING
- NCTC TIME DELAY SWITCH N.C. DELAY CLOSING

TERMINAL BLOCKS

- TERMINAL IN PLC/PCM PANEL
- TERMINAL IN MOTOR CONTROL CENTER
- TERMINAL IN LOCAL STARTER CONTROL PANEL
- TERMINAL AT FIELD DEVICE
- TERMINAL IN RTU
- TERMINAL IN FIELD PANEL
- TERMINAL IN (USER CHOICE)
- DIGITAL BUS CONNECTOR
  - * = D - DEVICENET
  - * = PA- PROFIBUS PA
  - * = DP- PROFIBUS DP
  - * = H1- FOUNDATION FIELDBUS H1
  - * = H2- FOUNDATION FIELDBUS H2

I/O

- PLC DISCRETE (a) a = INPUT OR OUTPUT AS INDICATED
- PLC ANALOG (ANALOG / a) a = INPUT OR OUTPUT AS INDICATED
- DIGITAL BUS (DIGITAL / BUS)

MISC

- SOLENOID
- METER UNIT (M) M = TYPE
- MOTOR (HP)
- CIRCUIT BREAKER
- DISCONNECT
- FUSE
- TRANSIENT SURGE PROTECTION
- MOTOR WINDING HEATER (MWH-*) * - MOTOR TAG I.D.
- SPACE HEATER
- VARISTOR
- CAPACITOR
- RESISTOR
- BATTERY
- DIODE
- MOTOR OVERLOAD HEATERS
- OVERLOAD CONTACT
- DRAWOUT CONNECTION
- GROUND
- LIGHTNING ARRESTOR
- CONTROL POWER TRANSFORMER (H1, H3, H2, H4 / X1, X2)
- ELAPSED TIME METER (KI-* / ETM)

REV	DATE	BY	DESCRIPTION

DESIGNED MAG
DRAWN DVP
CHECKED EP
DATE JULY 2011

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
SCHEMATIC SYMBOLS

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JOB NO. 7880I10
DRAWING NO. E-02

LAST SAVED BY: dperry

PROJECT NO. 7880I00 FILE NAME: 7880I10-00-E-002.dgn

ABBREVIATIONS

A	AMP
AAP	ALARM ANNUNCIATOR PANEL
ABAN	ABANDON
ABCB	AIR BLAST CIRCUIT BREAKER
ABS	ABSOLUTE
ABSW	AIR BREAK SWITCH
ABT	AIR BLAST TRANSFORMER
AC	ALTERNATING CURRENT
ACB	AIR CIRCUIT BREAKER
ACK	ACKNOWLEDGE
ACP - X	AREA/AUXILIARY CONTROL PANEL NO. X
ACTR	ACTUATOR
ADDL	ADDITIONAL
ADDM	ADDENDUM
AF	AMP FRAME
AFC	AUTOMATIC FREQUENCY CONTROL
AHC	AUTO-HOLD-CLOSED
AHM	AMPERE HOUR METER
AIC	AMP INTERRUPTING CAPACITY
AM	AMMETER
AMB	AMBIENT
ANN	ANNUNCIATOR
ANT	ANTENNA
APU	AUXILIARY POWER UNIT
ARM	ARMORED CABLE
AS	AMMETER SWITCH
ASU	AIR SUPPLY UNIT
ASYM	ASYMMETRICAL
AT	AMP TRIP
ATO	AUTOMATIC THROW OVER
ATP	AMMETER TEST POINT
ATS	AUTOMATIC TRANSFER SWITCH
AUTO XFMR	AUTOMATIC TRANSFORMER
AUX	AUXILIARY
AWG	AMERICAN WIRE GAGE
B	BELL
BAT	BATTERY
BCT	BUSHING CURRENT TRANSFORMER
BDCT	BUS DIFFERENTIAL CURRENT TRANSFORMER
BFG	BELOW FINISHED GRADE
BHP	BRAKE HORSEPOWER
BKR	BREAKER
BPD	BUSHING POTENTIAL DEVICE
BRF	BELOW RAISED FLOOR
C	CONDUIT / CONTINUOUS LOAD
C-A-M	COMPUTER-AUTO MANUAL
CB	CIRCUIT BREAKER
CC	CONTROL CABLE
CCS	CENTRAL CONTROL SYSTEM
CCT	CONTROL CIRCUIT TRANSFORMER
CCTV	CLOSED CIRCUIT TELEVISION
CCW	COUNTER CLOCKWISE
CFP	CHEMICAL FEED PUMP
CKT	CIRCUIT
C-M	COMPUTER MANUAL
CO	CUT OFF SWITCH
COAX	COAXIAL CABLE
COEF	COEFFICIENT
COM	COMMON
COMM	COMMUNICATION
CPT	CONTROL POWER TRANSFORMER
CP - X	CONTROL PANEL DESIGNATION X
CR - X	CONTROL RELAY DESIGNATION X
CS	CONTROL SWITCH
CT	CURRENT TRANSFORMER
CTC	CURRENT TRANSFORMER CABINET
CTRL	CONTROL
CV	CONTROL VALVE
CW	CLOCKWISE / COOL WHITE
CWX	COOL WHITE DELUXE
DC	DIRECT CURRENT
DCS	DISTRIBUTED CONTROL SYSTEM
DCU - X	DISTRIBUTED CONTROL UNIT NO. X
DD	DELAY UPON DE-ENERGIZING
DE	DELAY UPON ENERGIZING
DEEN	DE-ENERGIZE
DEMO	DEMOLITION
DEV	DEVIATION
DISC	DISCONNECT SWITCH
DIV	DIVISION
DM	DEMAND METER
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DS	DOOR SWITCH
DW	DELUXE WHITE
DX	DIRECT EXPANSION

E/G	EMERGENCY GENERATOR
E.C.	ELECTRICAL CONTRACTOR
EM	EMERGENCY
EMF	ELECTROMOTIVE FORCE
EMT	ELECTRICAL METALLIC TUBING
EN	ENERGIZED
ENAM	ENAMEL
ENCL	ENCLOSURE
ENG	ENGINE
ENT	ELECTRICAL NON-METALLIC TUBING
EP	EXPLOSION PROOF
ESD	EMERGENCY STOP DEPRESSED
ESR	EMERGENCY STOP RELAY
ETM	ELAPSED TIME METER
F	SUBFED LOAD
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS
FC	FOOTCANDLE / FAIL CLOSED
FDR	FEEDER
FLA	FULL LOAD AMPS
FLP	FAIL TO LAST POSITION
FLUOR	FLUORESCENT
FLX	FLEXIBLE CONDUIT
FM	FREQUENCY MODULATION / FLOOR MOUNTED
FO	FAIL OPEN / FIBER OPTIC
F-O-S	FAST-OFF-SLOW
F-O-S-A	FAST-OFF-SLOW-AUTO
F-O-S-R	FAST-OFF-SLOW-REMOTE
FP - X	FIELD PANEL NO. X
FRC	FIBERGLASS RIGID CONDUIT
FREQ	FREQUENCY
FS	FLOAT SWITCH
FU	FUSE
FU SW	FUSED SWITCH
FUT	FUTURE
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
FWD	FORWARD
G	GROUND / EQUIPMENT GROUND / GROUND FAULT
GEN	GENERATOR
GRC	GALVANIZED RIGID CONDUIT
GFCI	GROUND FAULT CIRCUIT INTERRUPTER (RECEPTACLE)
GFE	GFI EQUIPMENT BREAKER (30mA)
GFP	GFI PERSONNEL BREAKER (5mA)
GFI	GROUND FAULT INTERRUPTER (BREAKER)
GFR	GROUND FAULT RELAY
GS	GOVERNOR SWITCH
H	HOT-LEG
HF	HIGH FREQUENCY
Hg	MERCURY
HID	HIGH INTENSITY DISCHARGE
HO	HIGH OUTPUT
H-O-A	HAND-OFF-AUTO
H-O-R	HAND-OFF-REMOTE
HORIZ	HORIZONTAL
HP	HORSEPOWER
HPF	HIGH POWER FACTOR
HPS	HIGH PRESSURE SODIUM
HR	HOUR
HS	HAND OPERATED SELECTOR SWITCH
HSTAT	HUMIDISTAT
HV	HIGH VOLTAGE
HVAC	HEATING/VENTILATION/AIR CONDITIONING
HZ	HERTZ
I	INTERMITTENT LOAD / INSTANTANEOUS
IC	INTERRUPTING CAPACITY
IGN	IGNITION
IJB	INSTRUMENT JUNCTION BOX
IMC	INTERMEDIATE METAL CONDUIT
INCAND	INCANDESCENT
INST	INSTANTANEOUS
INSTR	INSTRUMENT
INT	INTERLOCK
INTERCOM	INTERCOMMUNICATION
IW#	IN WALL (#-INCHES AFF OR AFG)
IWP	IN WALL WEATHERPROOF
J	JUNCTION BOX
K	KEY INTERLOCK
KA	KILOAMP
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVAR (REACTANCE)
KW	KILOWATT
KWD	KILOWATT DEMAND
KWH	KILOWATT HOUR

L	LONG-TIME
L-B	LINE-BUS
L-G	LINE-GROUND
L1, L2, L3	LIGHTING PANEL BRANCH CIRCUIT
LA	LIGHTNING ARRESTOR
LB	POUND
LBL	LABEL
LC	LIGHTING CONTACT OR
LCP- X	LOCAL CONTROL PANEL NO. X
LDR	LOADING RELAY
LEL	LOWER EXPLOSIVE LIMIT
LL	LEAD-LAG LOAD REACTOR
LLCO	LOW LEVEL CUT-OFF
LOR	LOCAL-OFF-REMOTE
LOS	LOCK-OUT STOP
LP	LIGHT POLE
LP - X	LIGHTING PANEL NO. X
LR	LATCHING RELAY LINE REACTOR
LRA	LOCKED ROTOR AMPS
LS	LIMIT SWITCH
LTG	LIGHTING
LV	LOW VOLTAGE
LVL	LEVEL
M-X	MOTOR CONTROLLER NO. X
MA	MILLIAMPERE
MANUAL	MANUAL
MATV	MASTER ANTENNA TELEVISION SYSTEM
MAX	MAXIMUM
MC	MODULATE-CLOSE
MCA	MOTOR CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC - X	MOTOR CONTROL CENTER NO. X
MCP	MOTOR CIRCUIT PROTECTOR
MERC	MERCURY VAPOR
M/G	MOTOR GENERATOR
MGO	MAGNETICALLY OPERATED
MH	MANHOLE / MOUNTING HEIGHT
MLO	MAIN LUGS ONLY
MO	MANUALLY OPERATED
MOD	MOTOR OPERATED DAMPER
MOT	MOTOR
MOV	METAL OXIDE VARISTOR
MPR	MOTOR PROTECTION RELAY
MS-X	MOTOR STARTER NO. X
MSP	MOTOR STARTING PANEL
MTO	MANUAL THROW OVER
MTR-X	MOTOR NO. X
MTS	MANUAL TRANSFER SWITCH
MV	MEGAVOLT
MVA	MEGAVOLT-AMPERES
MW	MEGAWATT
MWH	MOTOR WINDING HEATER
N	NEUTRAL / NORTH / NITROGEN
NC	NORMALLY CLOSED
NCTO	NORMALLY CLOSED TIMED OPEN
NEC	NATIONAL ELECTRICAL CODE
NEG	NEGATIVE
NEUT	NEUTRAL
NFC	NONMETALLIC FLEXIBLE CONDUIT
NIC	NOT IN CONTRACT
N-J	NORMAL-JOG
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NOTC	NORMALLY OPEN TIMED CLOSED
NP	NAMEPLATE
O	OPEN OR OPENED
O-C	OPEN-CLOSE
O-C-A	OPEN-CLOSE-AUTO
OCB	OIL CIRCUIT BREAKER
OCR	OIL CIRCUIT RECLOSER
OH	OVERHEAD
OHGW	OVERHEAD GUY WIRE
OL	OVERLOAD RELAY
O-O	ON-OFF
O-O-A	ON-OFF-AUTO
O-O-R	ON-OFF-REMOTE
OPT	OPTIONAL
O-R	OFF-REMOTE
O-S-C	OPEN-STOP-CLOSE
P	POLE
PA	PUBLIC ADDRESS
PB	PUSHBUTTON / PULL BOX
PCP - X	PUMP CONTROL PANEL NO. X
PCS	PVC COATED GALVANIZED STEEL CONDUIT
PCM	PROCESS CONTROL MODULE
PE	PHOTOCELL
PF	POWER FACTOR
PFC	POWER FACTOR CORRECTION CAPACITOR
PFR	PHASE FAILURE RELAY
PH	PHASE
PNL	PANEL
PPX	POWER PANEL NO. X
PRI	PRIMARY
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE RIGID PLASTIC CONDUIT
PWR	POWER

RAC	RIGID ALUMINUM CONDUIT
R - X	RESISTOR OR POTENTIOMETER NO. X
RECPT	RECEPTACLE
REV	REVERSE
RF	RADIO FREQUENCY
RH	RELATIVE HUMIDITY
RM - X	REMOTE MODULE NO. X
R-O-A	REMOTE-ON-AUTO
RS	RAPID START
RVAT	REDUCED VOLTAGE AUTO TRANSFORMER
RVNR	REDUCED VOLTAGE NON-REVERSING
RVSS	REDUCED VOLTAGE SOLID STATE
S	SHIELD / SHORT-TIME
S/A	SURGE ARRESTER
SDBC	SOFT DRAWN BARE COPPER
SEC	SECOND
S-F	SLOWER-FASTER
SFL	SUB FEED LUGS
SIG	SIGNAL
SLT	SEALTIGHT LIQUIDTIGHT FLEXIBLE CONDUIT
SM	SURFACE MOUNTED
SP	SINGLE POLE
SPD	SURGE PROTECTIVE DEVICE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SPKR	SPEAKER
S-S	START-STOP
SS	SOLID STATE
SSC	SUPERVISORY SET POINT CONTROL
STB	SHORTING TERMINAL BLOCK
SV	SOLENOID VALVE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYM	SYMBOL
SYS	SYSTEM
TACH	TACHOMETER
TB - X	TERMINAL BLOCK - UNIT X
TC	THERMOCOUPLE / TIME CLOCK / TRAY CABLE
TD	TEMPERATURE DETECTOR RELAY
TDR	TIME DELAY RELAY
TE	TOTALLY ENCLOSED
TEFC	TOTALLY ENCLOSED FAN COOLED
TEMP	TEMPORARY
TENV	TOTALLY ENCLOSED NON-VENTILATED
TERM	TERMINAL
TJB	TERMINAL JUNCTION BOX
TM	THERMAL MAGNETIC
TOT	TOTAL
TP	TWISTED PAIR
TS	TEMPERATURE SWITCH
TS1W	TWO SPEED CONSEQUENT POLE, ONE WINDING
TS2W	TWO SPEED SEPARATE WINDING
TSTAT	THERMOSTAT
TU OR TURB	TURBIDITY
UHF	ULTRA HIGH FREQUENCY
UNG	UNGROUNDED
UPS	UNINTERRUPTABLE POWER SUPPLY
UVR	UNDER VOLTAGE RELAY
V	VOLT
VA	VOLT AMPERE
VAR	VARMETER
VB	VACUUM BREAKER
VCO	VOLTAGE CONTROLLED OSCILLATOR
VCP	VENDOR CONTROL PANEL
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
VHF	VERY HIGH FREQUENCY
VHO	VERY HIGH OUTPUT
VM	VOLTMETER
VP	VAPORPROOF
VR	VOLTAGE REGULATOR
VS	VOLTMETER SWITCH
VT	VOLTAGE TRANSFORMER
VTP	VOLTAGE TEST POINT
W	WATT / WEST
WHD	WATTHOUR DEMAND METER
WHM	WATTHOUR METER
WM	WATTMETER
WT	WATER TIGHT
WP	WEATHER PROOF
XFMR	TRANSFORMER
ZS	POSITION SWITCH

NOTES:

1. REFER TO OTHER DRAWINGS FOR ADDITIONAL ABBREVIATIONS.

ANSI STANDARD POWER DEVICE FUNCTION NUMBERS

1	MASTER ELEMENT
2	TIME-DELAY STARTING OR CLOSING RELAY
3	CHECKING OR INTERLOCKING RELAY
4	MASTER CONTACTOR
5	STOPPING DEVICE
6	STARTING CIRCUIT BREAKER
7	ANODE CIRCUIT BREAKER
8	CONTROL POWER DISCONNECTING DEVICE
9	REVERSING DEVICE
10	UNIT SEQUENCE SWITCH
11	RESERVED FOR FUTURE APPLICATION
12	OVER-SPEED DEVICE
13	SYNCHRONOUS-SPEED DEVICE
14	UNDER-SPEED DEVICE
15	SPEED OR FREQUENCY MATCHING DEVICE
16	RESERVED FOR FUTURE APPLICATION
17	SHUNTING OR DISCHARGE SWITCH
18	ACCELERATING OR DECELERATING DEVICE
19	STARTING-TO-RUNNING TRANSITION CONTACTOR
20	ELECTRICALLY OPERATED VALVE
21	DISTANCE RELAY
22	EQUALIZER CIRCUIT BREAKER
23	TEMPERATURE CONTROL DEVICE
24	RESERVED FOR FUTURE APPLICATION
25	SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE
25A	AUTOMATIC SYNCHRONIZING RELAY
26	APPARATUS THERMAL DEVICE
27	UNDERVOLTAGE RELAY
27N	GROUND FAULT UNDERVOLTAGE RELAY
28	FLAME DETECTOR
29	ISOLATING CONTACTOR
30	ANNUNCIATOR RELAY
31	SEPARATE EXCITATION DEVICE
32	DIRECTIONAL POWER RELAY
33	POSITION SWITCH/CELL SWITCH
34	MASTER SEQUENCE DEVICE
35	BRUSH-OPERATING OR SLIP-RING SHORT-CIRCUITING DEVICE
36	POLARITY OR POLARIZING VOLTAGE DEVICE
37	UNDERCURRENT OR UNDERPOWER RELAY
38	BEARING PROTECTIVE DEVICE
39	MECHANICAL CONDITION MONITOR
40	FIELD RELAY
41	FIELD CIRCUIT BREAKER
42	RUNNING CIRCUIT BREAKER
43	MANUAL TRANSFER OR SELECTOR DEVICE
44	UNIT SEQUENCE STARTING RELAY
45	ATMOSPHERIC CONDITION MONITOR
46	REVERSE-PHASE OR PHASE-BALANCE CURRENT RELAY
46N	NEGATIVE SEQUENCE OVERCURRENT RELAY
47	PHASE-SEQUENCE VOLTAGE RELAY
47N	NEGATIVE SEQUENCE VOLTAGE RELAY
48	INCOMPLETE SEQUENCE RELAY
49	MACHINE OR TRANSFORMER THERMAL RELAY
49/50	MOTOR THERMAL & INSTANTANEOUS RELAY
50	INSTANTANEOUS OVERCURRENT OR RATE-OF-RISE RELAY
50BF	BREAKER FAILURE RELAY
50GS	GROUND SENSOR INSTANTANEOUS OVERCURRENT RELAY
50/51	PHASE TIME & INSTANTANEOUS OVERCURRENT RELAY
51	AC TIME OVERCURRENT RELAY
51B	PHASE TIME OVERCURRENT RELAY
51G	GROUND TIME OVERCURRENT RELAY
51N	RESIDUALLY CONNECTED TIME OVERCURRENT RELAY
51NB	RESIDUALLY CONNECTED TIME OVERCURRENT RELAY
51/27C	VOLTAGE CONTROLLED TIME OVERCURRENT
51/27R	VOLTAGE RESTRAINED TIME OVERCURRENT
52	AC CIRCUIT BREAKER
53	EXCITER OR DC GENERATOR RELAY
54	RESERVED FOR FUTURE APPLICATION
55	POWER FACTOR RELAY
56	FIELD APPLICATION RELAY
57	SHORT-CIRCUITING OR GROUNDING DEVICE
58	RECTIFICATION FAILURE RELAY
59	OVERVOLTAGE RELAY
59N	GROUND FAULT OVERVOLTAGE RELAY
59/81	VOLTS PER HERTZ OVEREXCITATION RELAY
60	VOLTAGE OR CURRENT BALANCE RELAY
61	RESERVED FOR FUTURE APPLICATION
62	TIME-DELAY STOPPING OR OPENING RELAY
63	PRESSURE SWITCH
64	GROUND PROTECTIVE RELAY
65	GOVERNOR
66	NOTCHING OR JOGGING DEVICE
67	AC DIRECTIONAL OVERCURRENT RELAY
68	BLOCKING RELAY
69	PERMISSIVE CONTROL DEVICE
70	RHEOSTAT
71	LEVEL SWITCH
72	DC CIRCUIT BREAKER
73	LOAD-RESISTOR CONTACTOR
74	ALARM RELAY
75	POSITION CHANGING MECHANISM
76	DC OVERCURRENT RELAY
77	PULSE TRANSMITTER
78	PHASE-ANGLE MEASURING OR OUT-OF-STEP PROTECTIVE RELAY
79	AC RECLOSING RELAY
80	FLOW SWITCH
81	FREQUENCY RELAY
82	DC RECLOSING RELAY
83	AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY
84	OPERATING MECHANISM
85	CARRIER OR PILOT-WIRE RECEIVER RELAY
86	LOCKOUT RELAY
86M	MOTOR LOCKOUT RELAY
87	DIFFERENTIAL PROTECTIVE RELAY
87M	MOTOR DIFFERENTIAL RELAY
87T	HIGH SPEED TRANSFORMER DIFFERENTIAL RELAY
87TG	TRANSFORMER GROUND DIFFERENTIAL RELAY
88	AUXILIARY MOTOR OR MOTOR GENERATOR
89	LINE SWITCH
90	REGULATING DEVICE
91	VOLTAGE DIRECTIONAL RELAY
92	VOLTAGE AND POWER DIRECTIONAL RELAY
93	FIELD-CHANGING CONTACTOR
94	TRIPPING OR TRIP-FREE RELAY
95 – 99	USED ONLY FOR SPECIFIC APPLICATIONS IN INDIVIDUAL INSTALLATIONS WHERE NONE OF THE ASSIGNED NUMBERED FUNCTIONS FROM 1 TO 94 ARE SUITABLE.

COMMONLY USED SUFFIX LETTERS APPLIED TO ANSI STANDARD POWER DEVICE FUNCTION NUMBERS

A	ALARM ONLY
B	BUS PROTECTION
G	GROUND FAULT PROTECTION (RELAY CT IN A SYSTEM NEUTRAL CIRCUIT OR GENERATOR PROTECTION)
GS	GROUND FAULT PROTECTION (RELAY CT IN TOROIDAL OR GROUND SENSOR TYPE)
L	LINE PROTECTION
M	MOTOR PROTECTION
N	GROUND FAULT PROTECTION (RELAY COIL CONNECTED IN RESIDUAL CT CIRCUIT)
T	TRANSFORMER PROTECTION
V	VOLTAGE

REV	DATE	BY	DESCRIPTION

DESIGNED MAG
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DATE JULY 2011

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
ABBREVIATIONS

VERIFY SCALES
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0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 7880I10
DRAWING NO. E-03

LAST SAVED BY: dperry

PROJECT NO. 7880I00 FILE NAME: 7880I10-00-E-003.dgn

HARNESS

CONTINUE TO CLARIFIER NO.5

SECONDARY CLARIFIER NO.2 DWG. E-07

EXISTING ELECTRIC ROOM

A - / A E-10

B -

E E-12 SCUM PIT

1

RAS/WAS PUMP BUILDING SEE SHEET E-09

SECONDARY CLARIFIER NO.1 DWG. E-07

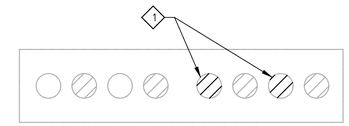
EXISTING HEADWORKS BUILDING ELECTRICAL ROOM SEE SHEET E-09

KEY NOTES:

1 ADD NEW WIRING PER CONDUIT SCHEDULE IN EXISTING SPARE CONDUITS.

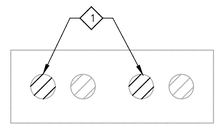
DEMOLITION NOTES:

1 DISCONNECT, REMOVE AND DISPOSE OF ABOVE GRADE CONDUIT AND CONDUCTORS. DISCONNECT, REMOVE AND DISPOSE OF WIRING IN UNDERGROUND CONDUITS. UNDERGROUND CONDUIT SHALL BE CUT 6" BELOW GRADE AND ABANDON IN PLACE.



A - DUCTBANK SECTION

SCALE: NTS
FILE:



B - DUCTBANK SECTION

SCALE: NTS
FILE:

REV	DATE	BY	DESCRIPTION

DESIGNED MAG
DRAWN DVP
CHECKED EP
DATE JULY 2011

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
SITE PLAN

VERIFY SCALES
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0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

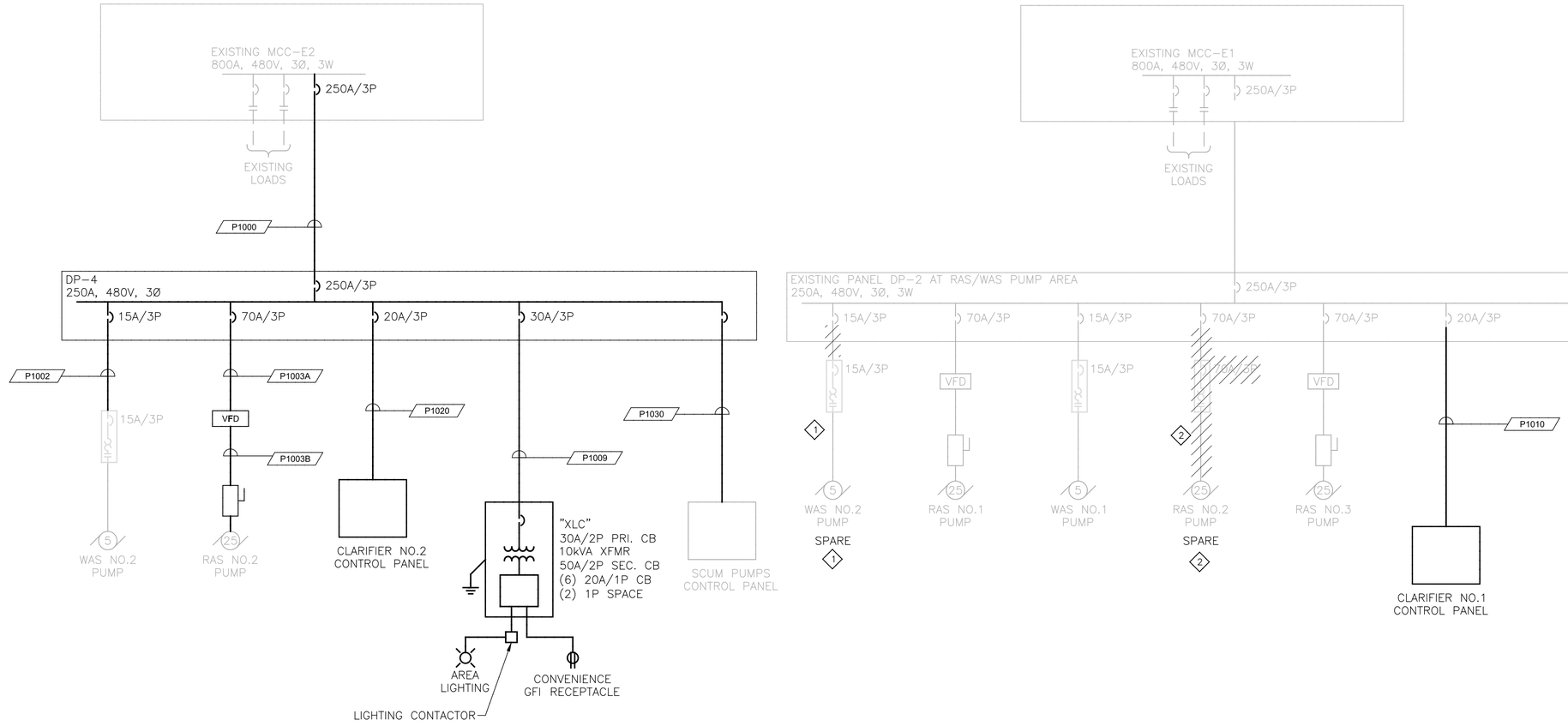
JOB NO. 7880I10
DRAWING NO. E-04

LAST SAVED BY: dperry

PROJECT NO. 7880I00 FILE NAME: 7880I10-00-E-004.dgn

KEY NOTES:

1. DISCONNECT EXISTING BRANCH CIRCUIT TO WAS PUMP NO.2 AND RECONNECT TO PANEL DP-4
2. DISCONNECT AND REMOVE EXISTING MOTOR STARTER AND BRANCH CIRCUIT RAS PUMP NO.2 AND RECONNECT TO PANEL DP-4 VIA NEW VFD FOR VARIABLE SPEED CONTROL. REMAINING CIRCUIT BREAKER SHALL BE RE-LABELED "SPARE".



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DATE JULY 2011

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
MCC AND PANELBOARDS ONE LINE DIAGRAMS

VERIFY SCALES
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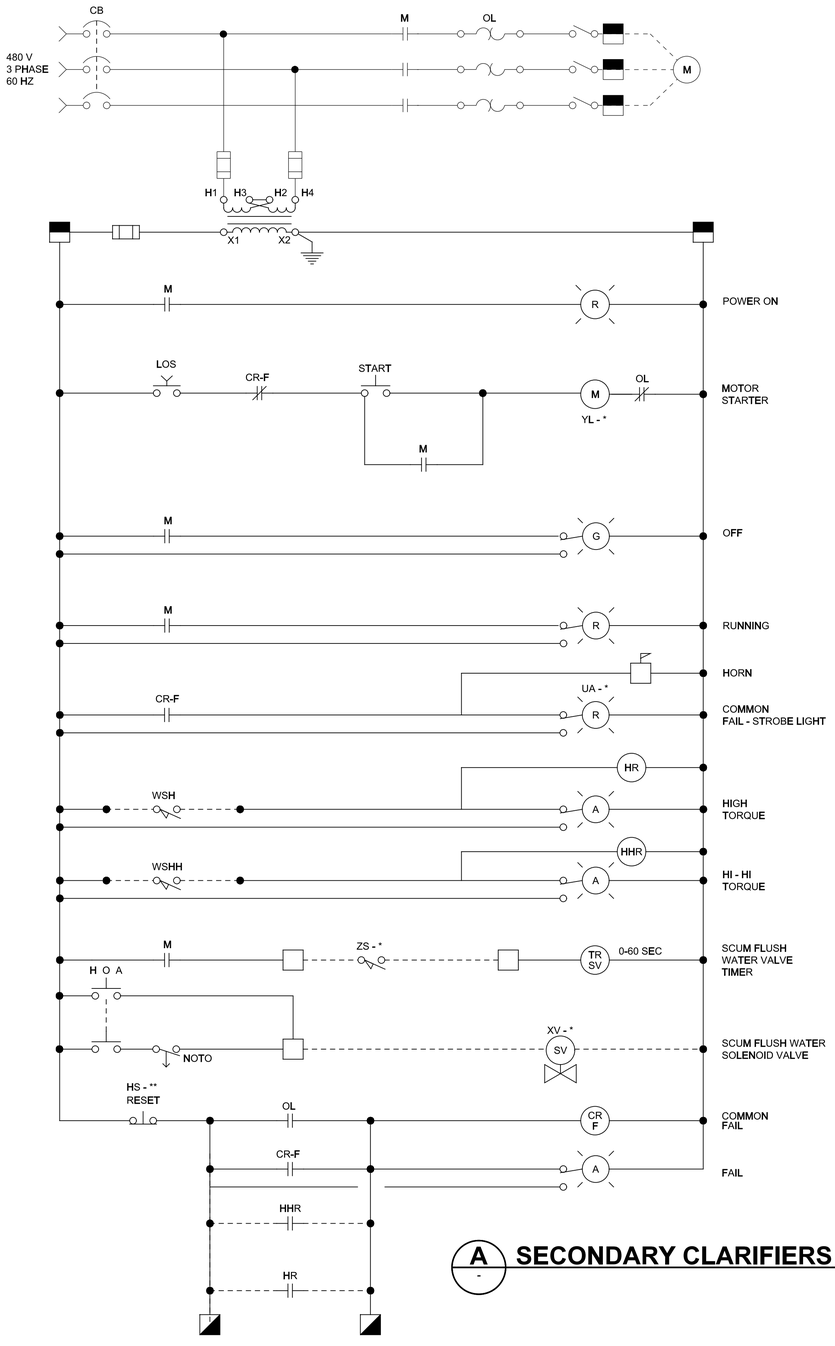
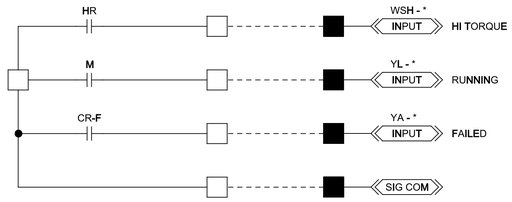
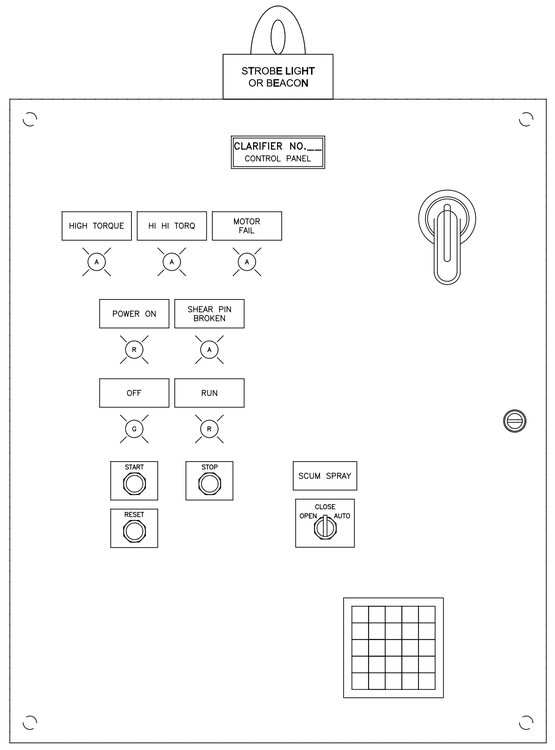
0 — 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 7880I10
DRAWING NO. E-05

LAST SAVED BY: dperry
PROJECT NO. 7880I00
FILE NAME: 7880I10-00-E-005.dgn







A - SECONDARY CLARIFIERS No.1 and No. 2 CONTROL SCHEMATIC

B - SECONDARY CLARIFIER No.1 and No. 2 CONTROL PANEL

LAST SAVED BY: dperry

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CHECKED EP
DATE JULY 2011

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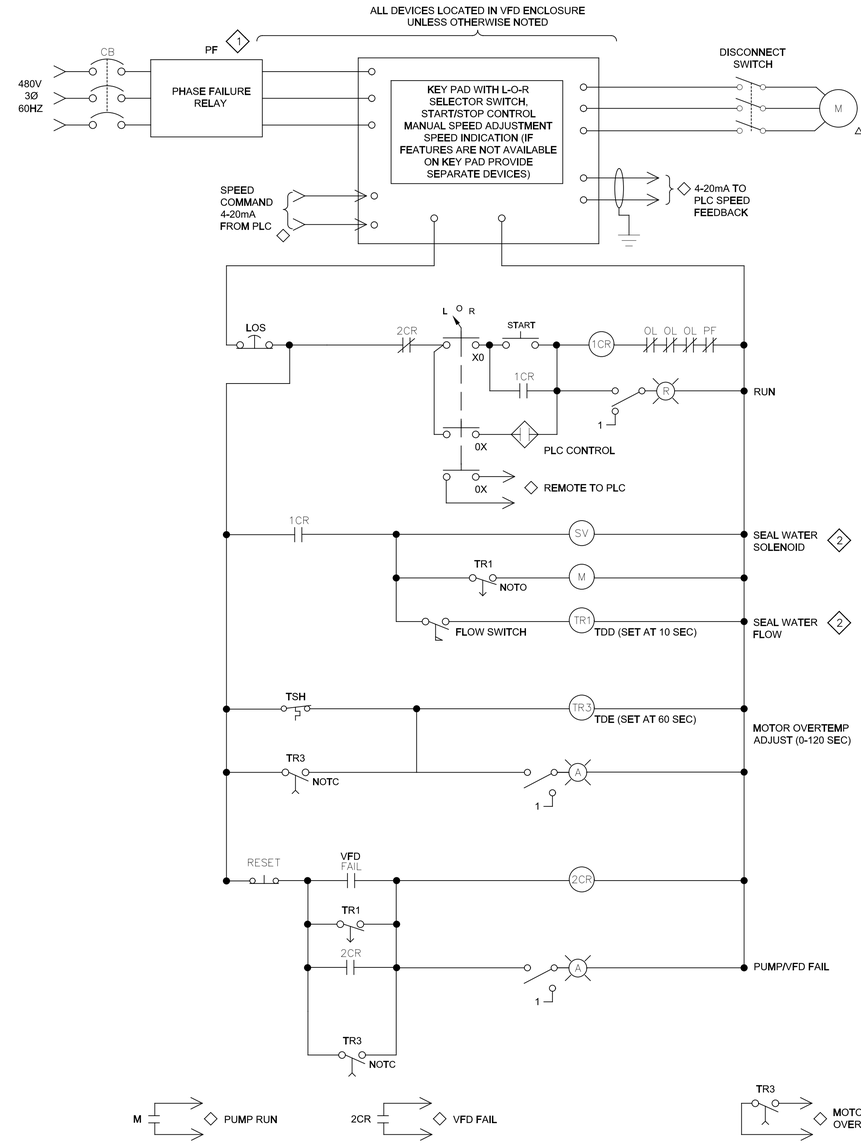
MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
CONTROL DETAILS

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

JOB NO. 7880I10
DRAWING NO. E-06

PROJECT NO. 7880I00 FILE NAME: 7880I10-00-E-006.dgn



A SCHEMATIC DIAGRAM No. 2

TYPICAL FOR: RAS-PMP 2 RAS PUMP NO.2

KEY NOTES:

1. PROVIDE SOLID STATE RELAY TO MONITOR SINGLE PHASE FAILURE
2. VERIFY RAS PUMP FIELD CONDITIONS AND ACCESSORIES AND PROVIDE NECESSARY DEVICES FOR CONTROL AND INTERCONNECTION WITH SEAL WATER DEVICES.

REV	DATE	BY	DESCRIPTION

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DATE JULY 2011

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
RAS PUMP NO.2 CONTROL SCHEMATIC

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

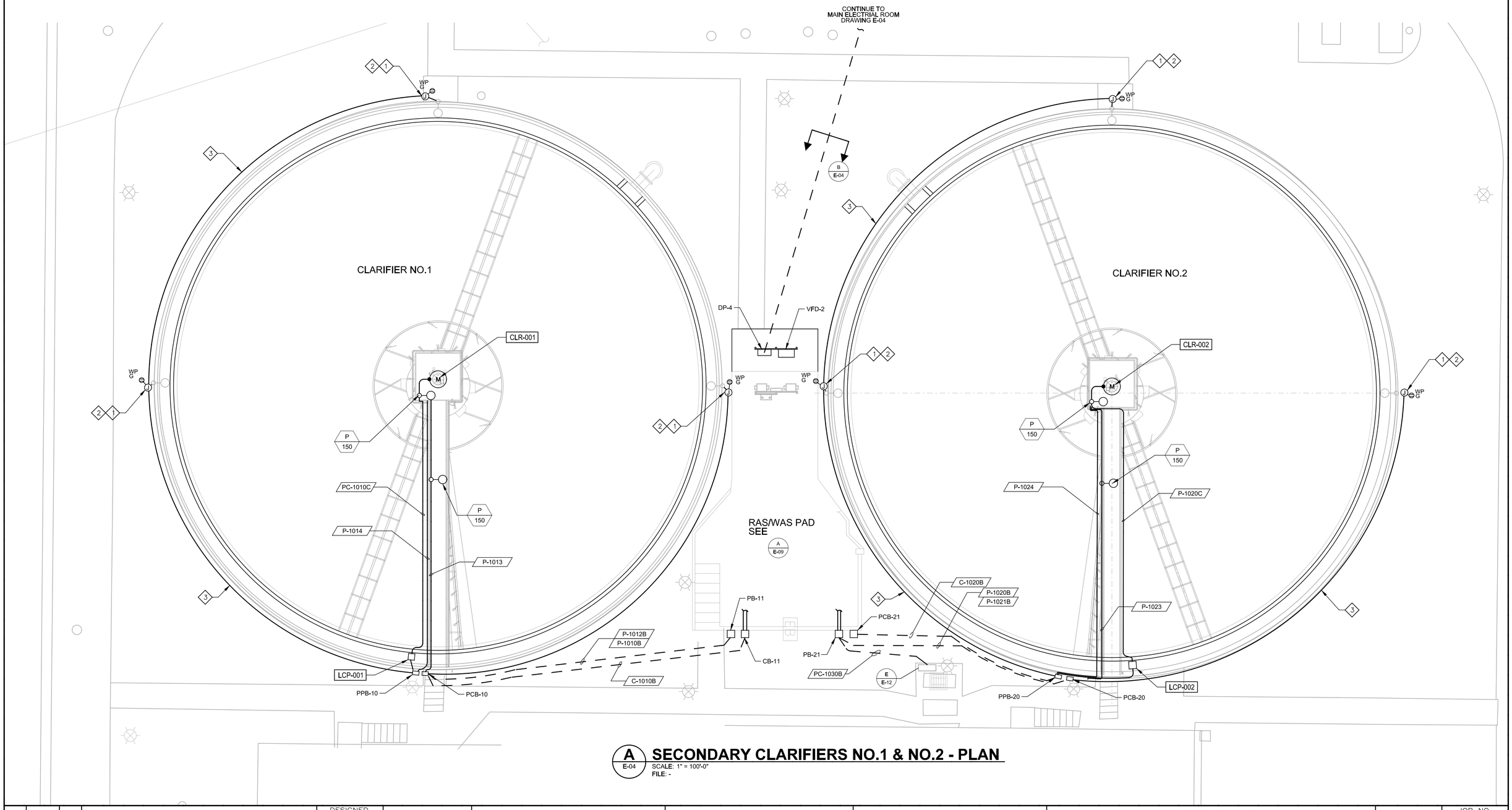
JOB NO. 7880I10
DRAWING NO. E-07

LAST SAVED BY: dperry
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-E-007.dgn

0 50' 100' 200'

KEY NOTES:

1. EXISTING LIGHTING POLE TO REMAIN. PROVIDE NEW HPS LAMP.
2. COORDINATE WITH GENERAL CONTRACTOR ABOUT APPROACH TO REFURBISH THE CLARIFIER PERIMETER AND RELATED WALKWAY WORK. PROVIDE ELECTRICAL SCOPE OF WORK INCLUDING REMOVAL STORAGE, PROTECTION AND RE-INSTALLATION OF LIGHTING POLES DUE TO POSSIBLE TEMPORARY REMOVAL AND REINSTALLATION OF EXISTING (PERIMETER) WALKWAY.
3. PROVIDE NEW PVC SCHEDULE 80 CONDUIT UNDER WALKWAY FOR NEW WIRING OF LIGHTING POLES AND RECEPTACLES.



A SECONDARY CLARIFIERS NO.1 & NO.2 - PLAN

A / E-04

SCALE: 1" = 100'-0"
FILE: -

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
POWER AND LIGHTING PLAN

VERIFY SCALES
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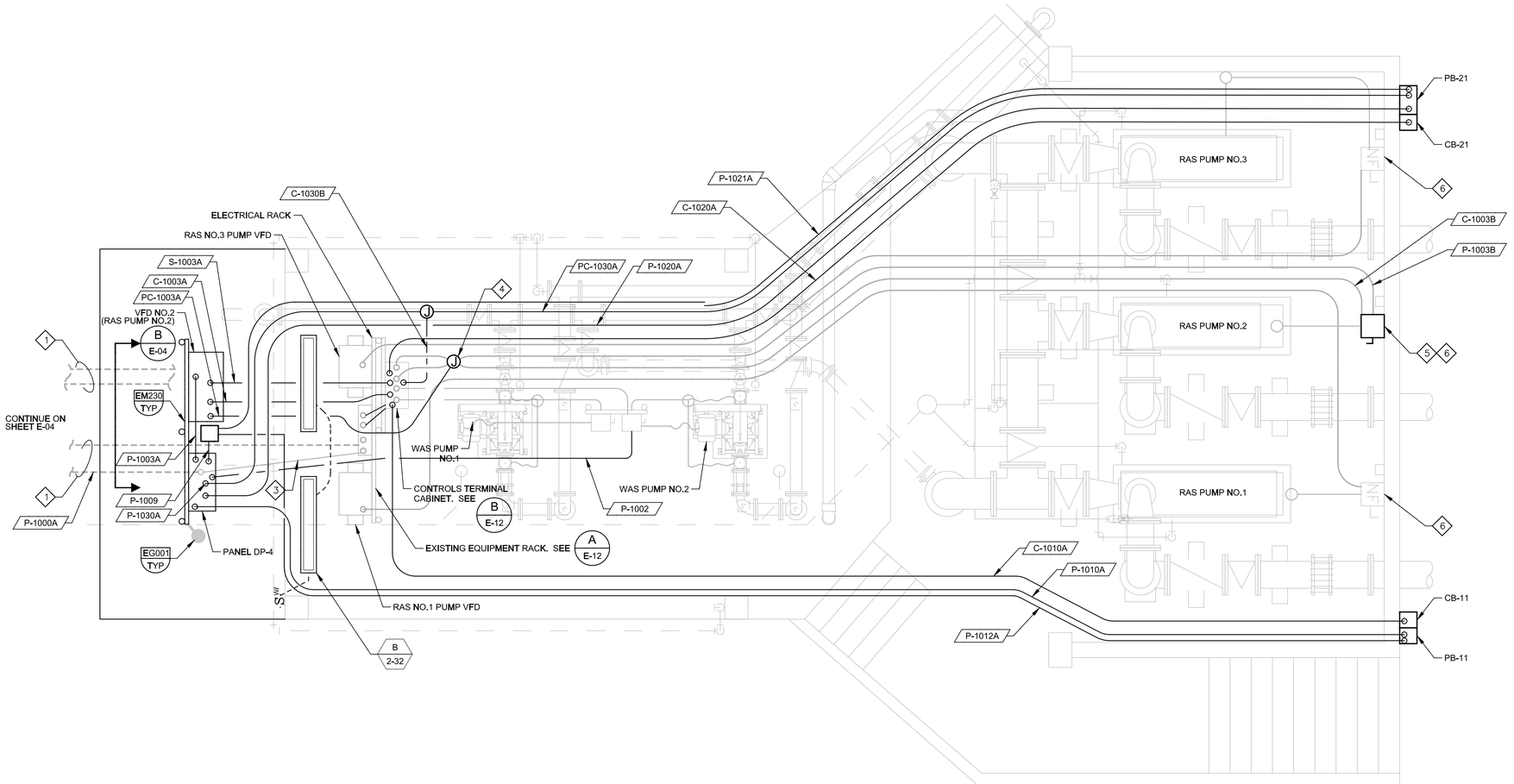
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 7880I10
DRAWING NO. E-08

LAST SAVED BY: dperry
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-E-008.dgn

KEY NOTES:

1. TWO (2) 3 IN. CONCRETE ENCASED SCHEDULE 40 PVC CONTROL CONDUITS, ONE TO MAIN ELECTRICAL BUILDING. EXTERIOR WALL CONTROL PULLBOX.
2. TWO (2) 3 IN. CONCRETE ENCASED SCHEDULE 40 PVC POWER CONDUITS, ONE ACTIVE, ONE SPARE TO MAIN ELECTRICAL BUILDING. EXTERIOR WALL-POWER PULLBOX.
3. INTERCEPT AND REMOVE EXISTING 3" SPARE CONDUIT STUB-UP IN PANEL "DP-2" AND STUB-UP INTO PANEL "DP-4".
4. INTERCEPT OVERHEAD 1" ALUMINUM CONDUIT FROM RAS PUMP NO.2, PROVIDE PULL BOX AND EXTEND CONDUIT TO VFD NO.2.
5. PROVIDE NEW DISCONNECT SWITCH FOR RAS PUMP NO. 2.
6. PROVIDE WARNING PLATE ON DISCONNECT SWITCH TO READ: "SHUTDOWN VFD EQUIPMENT PRIOR TO OPEN/CLOSE SWITCH"



A RAS/WAS PUMPS-PAD-PLAN ADDITIONS

A / E-07

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

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
CLARIFIERS NO.1 & NO.2 RAS/WAS PUMP PAD-PARTIAL PLAN - ADDITIONS

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

JOB NO. 7880I10
DRAWING NO. E-09

LAST SAVED BY: dperry
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-E-009.dgn

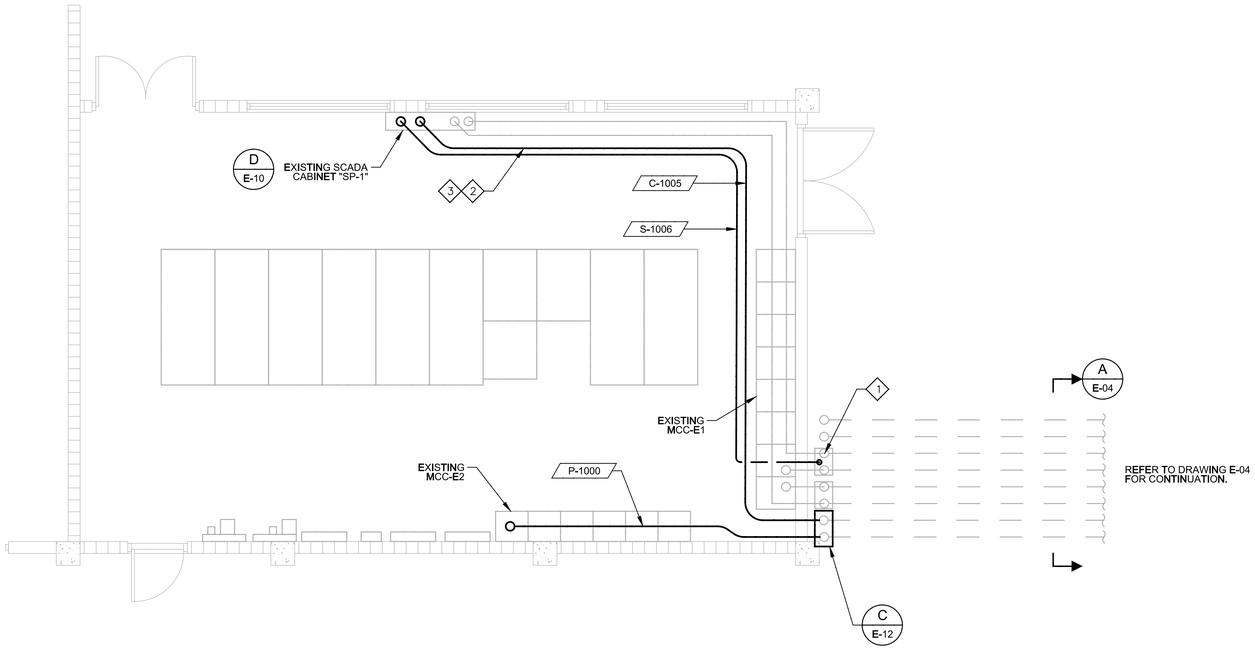
0 2' 4' 8'

DEMOLITION NOTES:

1. DISCONNECT, REMOVE AND DISPOSE OF ABOVE GRADE CONDUIT AND CONDUCTORS.
2. DISCONNECT, REMOVE AND DISPOSE OF EXISTING UNDERGROUND WIRING BETWEEN MCC AND PULL BOXES AT SECONDARY CLARIFIERS NO.1 & NO.2

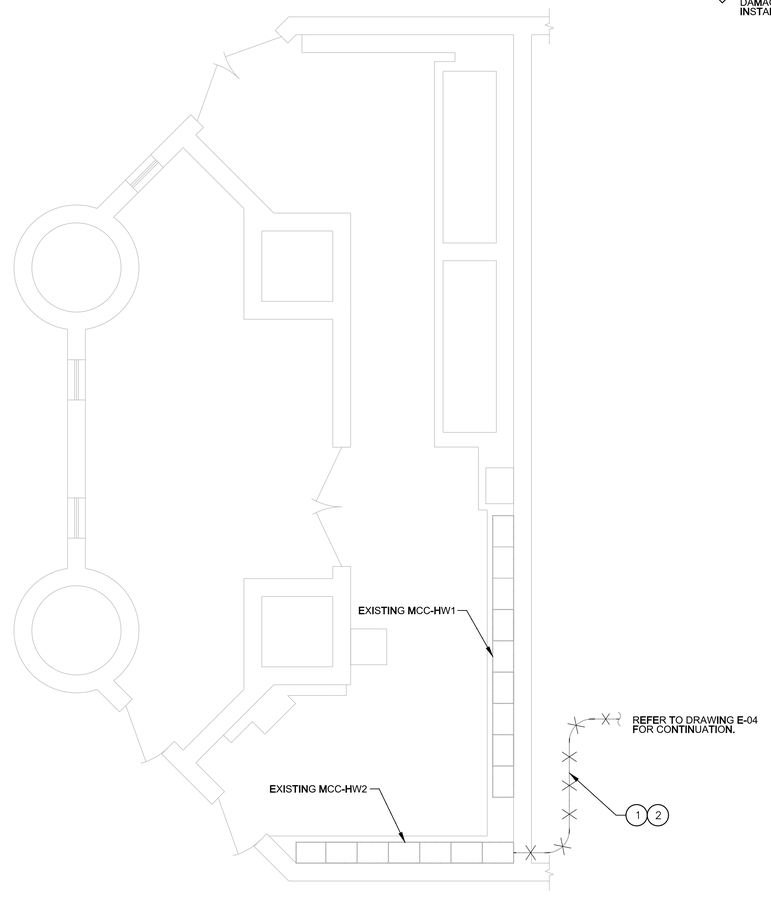
KEY NOTES:

1. INTERCEPT EXISTING SPARE CONDUIT AND PROVIDE PULL BOX.
2. PROVIDE CONDUIT ROUTED EXPOSED ABOVE SUSPENDED CEILING BETWEEN EXISTING SCADA CABINET "SP-1" AND EXTERIOR OF ELECTRICAL BUILDING FOR CLARIFIERS NO.1 & NO.2.
3. INCLUDE ALLOWANCE TO REPLACE ACOUSTIC PANELS IF DAMAGED DURING TEMPORARY REMOVAL. FOR INSTALLATION OF NEW CONDUITS.



A EXISTING MAIN ELECTRICAL ROOM - ADDITIONS

A / E-04 SCALE: 1/4" = 1'-0"
FILE:



B HEADWORKS ELECTRICAL ROOM - DEMOLITION

B / E-04 SCALE: 1/4" = 1'-0"
FILE:

LAST SAVED BY: dperry

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DATE JULY 2011

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
EXISTING ELECTRICAL BUILDING PARTIAL PLAN - ADDITIONS

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

JOB NO. 7880110
DRAWING NO. E-10

PROJECT NO. 7880100 FILE NAME: 7880110-00-E-010.dgn

PANEL 'DP-2' (EXISTING)

VOLTAGE: 480V' PHASE: 3 WIRE: 3 60HZ MIN. INTERRUPTING RATING: 65,000 A MAINS: CB AMPS: 250A MOUNTING: SURFACE NEMA: 4XSS

CKT NO	DESCRIPTION/LOCATION	BREAKERS POLE	BREAKERS AMPS	KVA	KVA	BREAKERS AMPS	BREAKERS POLE	DESCRIPTION/LOCATION	CKT NO
1									2
3	RAS #1	3	70	28.3	28.3	70	3	SPARE	4
5									6
7									8
9	RAS #3	3	70	28.3	--	--	3	SPACE	10
11									12
13									14
15	WAS #1	3	15	6.3	6.3	15	3	SPARE	16
17									18
19									20
21	SPARE	3	15	0.0	0.0	70	3	SPARE	22
23									24
25									26
27	SPACE	3		--	--	--	3	SPACE	28
29									30

CONNECTED LOAD: KVA

DP-2 LOAD SUMMARY

DESCRIPTION	LOAD	CONNECTED (kVA)	DEMAND FACTOR	DEMAND (kVA)	
RAS #1 PUMP	25 HP	28.3	125%	35.375	
RAS #3 PUMP	25 HP	28.3	100%	28.3	
WAS #1 PUMP	5 HP	6.3	100%	6.3	
APPROXIMATE TOTAL				69.97	kVA

PANEL 'DP-4'

VOLTAGE: 480V' PHASE: 3 WIRE: 3 60HZ MIN. INTERRUPTING RATING: 65,000 A MAINS: CB AMPS: 250A MOUNTING: SURFACE NEMA: 4XSS

CKT NO	DESCRIPTION/LOCATION	BREAKERS POLE	BREAKERS AMPS	KVA	KVA	BREAKERS AMPS	BREAKERS POLE	DESCRIPTION/LOCATION	CKT NO
1									2
3	SPARE	3	70	28.3	28.3	70	3	RAS #2	4
5									6
7									8
9	SPARE	3	20	28.3	--	--	3	SPACE	10
11									12
13									14
15	SPARE	3	15	6.3	6.3	15	3	WAS #2	16
17									18
19									20
21	SPARE	3	15	0.0	--	--	3	SPACE	22
23									24
25									26
27	PANEL "XLC-7"	3	60	--	--	--	3	SPACE	28
29									30

CONNECTED LOAD: xx KVA

DP-4 LOAD SUMMARY

DESCRIPTION	LOAD	CONNECTED (kVA)	DEMAND FACTOR	DEMAND (kVA)
RAS #1 PUMP	25 HP	28.3	100%	28.3
WAS #2 PUMP	5 HP	6.3	100%	6.3
PANEL "XLC"	--	5.0	60%	3.0
APPROXIMATE TOTAL				37.60

LIGHTING FIXTURE SCHEDULE

FIXT. TYPE	CATALOG AND NO.	NO. AND TYPE OF LAMPS	VOLT	MOUNTING	REMARKS, OR FEATURES
P	SPAULDING LIGHTING MEDALLION 1 SERIES – DIE CAST ALUMINUM HOUSING, 5 IN. RIGID ARM, SQUARE POLE TENON ADAPTER, TYPE III OR TYPE V DISTRIBUTION AS INDICATED ON DRAWINGS, FLAT LENS, GRAY THERMOSET POLYESTER POWDER PAINT FINISH. CATALOG NO: ___	(1) 100W HPS	120	12' MTG. HT ON SEAMLESS SQUARE ALUMINUM POLE ON ANCHOR BASE WITH GRAY THERMOSET POLYESTER POWDER PAINT FINISH.	IESNA FULL CUTOFF LIGHTING CLASSIFICATION, UL 1598 LISTED FOR USE IN WET LOCATIONS. 20A, 120V DUPLEX RECEPTACLE MOUNTED 12" ABOVE POLE HANDHOLE.
A	HOLOPHANE CAT. NO. HES-S-04-X-555-N-042-YP-1-1 OR EQUAL. 4' NOMINAL FIBERGLASS ENCLOSURE, ALUMINUM REFLECTOR, ELECTRONIC BALLAST SUITABLE FOR WET AND DAMP ENVIRONMENT.	2-F32T8	120	CEILING/PENDANT	–

LAST SAVED BY: dperry

REV	DATE	BY	DESCRIPTION

DESIGNED MAG
DRAWN DVP
CHECKED EP
DATE JULY 2011

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
PANELBOARDS AND FIXTURE SCHEDULES

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

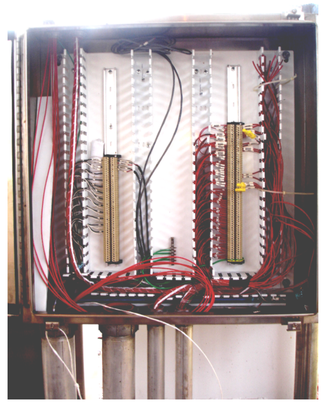
JOB NO. 7880110
DRAWING NO. E-11

PROJECT NO. 7880100 FILE NAME: 7880110-00-E-011.dgn

NOTES:

1. SEE DP-2 PANEL SCHEDULE (SHEET E-11) FOR WIRING CHANGES AND ADDITIONAL WORK.

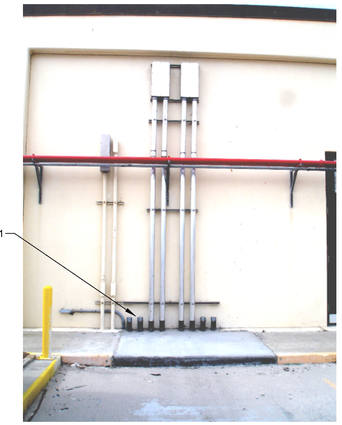
A E-09 DP2 & VFD CONTROL PANEL



NOTES:

1. PROVIDE ADDITIONAL TERMINAL BLOCKS FOR TERMINATION OF ADDITIONAL CONTROL WIRING.

B E-09 CONTROL TERM. PANEL



NOTES:

1. VERIFY 3" SPARE CONDUITS FOR POWER AND CONTROLS RELATED TO CLARIFIERS NO.1 AND NO.2 - RAS/WAS PUMPS.
2. PROVIDE NEW PULL BOX 24"H x 18"W x 12"D AND EXTEND 3" ALUMINUM CONDUITS FOR WIRING REQUIRED PER CONDUIT SCHEDULE.

C E-10 ELECTRICAL PULL BOXES

NOTES:

1. PROVIDE ADDITIONAL TERMINAL BLOCKS FOR TERMINATION OF ADDITIONAL CONTROL WIRING

D E-10 PLC CABINET @ MAIN ELECT. ROOM

NOTES:

1. REMOVE EXISTING POWER SOURCE WIRING AND RELATED CONTROL WIRING FROM HEADWORKS ELECTRICAL ROOM.
2. PROVIDE NEW POWER SOURCE FROM PANEL DP-4 AND PROVIDE NEW CONTROL WIRING TO EXISTING CONTROL TERMINAL CABINET FOR MONITORING STATUS VIA SCADA "PLC-SP1" AT MAIN ELECTRICAL ROOM.

E E-08 SCUM PUMPS 1 & 2 CONTROL PANEL

NOTES:

1. PROVIDE ADDITIONAL TRAPEZE FOR SUPPORT OF ADDITIONAL CONDUITS.

F E-09 RAS/WAS PUMP PAD OVERHEAD CONDUITS

REV	DATE	BY	DESCRIPTION

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DRAWN DVP
CHECKED EP
DATE JULY 2011

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
ELECTRICAL
DETAILS

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

JOB NO. 7880I10
DRAWING NO. E-12

LAST SAVED BY: dperry

PROJECT NO. 7880I00 FILE NAME: 7880I10-00-E-012.dgn

INSTRUMENT TAG IDENTIFICATION LETTERS

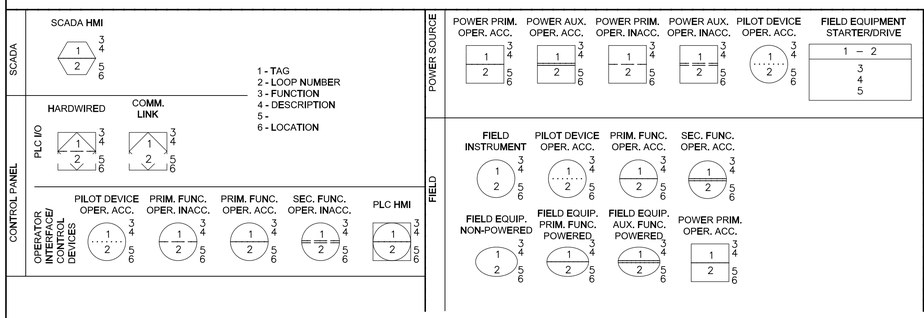
MEASURED VARIABLE \ INSTRUMENT FUNCTION		ELEMENT	TRANSMITTER	INDICATING TRANSMITTER	CONVERTER TRANSDUCER, RELAY SPECIAL DEVICES	INDICATOR	RECORDER	CONTROLLER	INDICATING CONTROLLER	RECORDING CONTROLLER	SWITCH	SWITCH LOW LOW	SWITCH LOW	SWITCH HIGH	SWITCH HIGH HIGH	SWITCH COMBINATION HIGH LOW	ACTION	ALARM LOW LOW	ALARM LOW	ALARM HIGH	ALARM HIGH HIGH	TOTALIZE INDICATOR TRANSMITTER	VALVE	GAUGE	LIGHT	SPEED SETTING
A	ANALYSIS	AE	AT	AIT	AY	AI	AR	AC	AIC	ARC	AS	ASLL	ASL	ASH	ASHH	ASHL		AALL	AAL	AAH	AAHH				AL	
B	FIRE/SMOKE	BE	BT	BIT	BY	BI	BR	BC	BIC	BRC	BS	BSLL	BSL	BSH	BSHH			BALL	BAL	BAH	BAHH				BL	
C	CONDUCTIVITY	CE	CT	CIT	CY	CI	CR	CC	CIC	CRC	CS	CSLL	CSL	CSH	CSHH	CSHL		CALL	CAL	CAH	CAHH				CL	
D	DENSITY	DE	DT	DIT	DY	DI	DR	DC	DIC	DRC	DS	DSLL	DSL	DSH	DSHH	DSHL		DALL	DAL	DAH	DAHH				DL	
E																										
F	FLOW	FE	FT	FIT	FY	FI	FR	FC	FIC	FRC	FS	FSLL	FSL	FSH	FSHH	FSHL		FALL	FAL	FAH	FAHH	FQI	FCV	FG	FL	
FF	FLOW RATIO				FFY	FFI		FFC	FFIC		FFS														FFL	
G	GAUGING (DIMENSION)																									
H	HAND (MANUAL)							HC			HS*						HA*						HV		HL	HSS
I	CURRENT		IT	IIT	IY	II	IR	IC	IIC	IRC	IS	ISLL	ISL	ISH	ISHH			IALL	IAL	IAH	IAHH				IL	
J	POWER																									
K	TIME				KY	KI	KR	KC	KIC	KRC	KS	KSLL	KSL	KSH	KSHH			KALL	KAL	KAH	KAHH		KV		KL	
L	LEVEL	LE	LT	LIT	LY	LI	LR	LC	LIC	LRC	LS	LSLL	LSL	LSH	LSHH	LSHL		LALL	LAL	LAH	LAHH		LCV	LG	LL	
M	MOISTURE OR HUMIDITY	ME	MT	MIT	MY	MI	MR	MC	MIC	MRC	MS	MSLL	MSL	MSH	MSHH			MALL	MAL	MAH	MAHH				ML	
N	EMERGENCY SHUTDOWN																									
O																										
P	PRESSURE OR VACUUM	PE	PT	PIT	PY	PI	PR	PC	PIC	PRC	PS	PSLL	PSL	PSH	PSHH	PSHL		PALL	PAL	PAH	PAHH		PCV		PL	
PD	DIFFERENTIAL PRESSURE		PDT	PDIT	PDY	PDI	PDR	PDC	PDIC	PDRC	PDS	PDSLL	PDSL	PDSH	PDSHH			PDALL	PDAL	PDAH	PDAHH		PDCV		PDL	
Q	QUANTITY	QE	QT	QIT	QY	QI	QR				QS	QSLL	QSL	QSH	QSHH			QALL	QAL	QAH	QAHH					
R	RADIOACTIVITY																									
S	SPEED	SE	ST	SIT	SY	SI	SR	SC	SIC	SRC	SS	SSLL	SSL	SSH	SSHH			SALL	SAL	SAH	SAHH					
T	TEMPERATURE	TE	TT	TIT	TY	TI	TR	TC	TIC	TRC	TS	TSLL	TSL	TSH	TSHH	TSHL		TALL	TAL	TAH	TAHH		TCV		TL	
TD	DIFFERENTIAL TEMPERATURE		TDT	TDIT	TDY	TDI	TDR	TDC	TDIC	TDRC	TDS	TDSLL	TDSL	TDSH	TDSHH			TDALL	TDAL	TDAH	TDAHH		TDCV		TDL	
U	MULTIVARIABLE					UI	UR	UC	UIC	URC	US														UL	
V	VISCOSITY	VE	VT	VIT	VY	VI	VR	VC	VIC	VRC	VS	VSLL	VSL	VSH	VSHH			VALL	VAL	VAH	VAHH				VL	
W	WEIGHT	WE	WT	WIT	WY	WI	WR				WS	WSLL	WSL	WSH	WSHH			WALL	WAL	WAH	WAHH					
X	USER DEFINED	XE	XT	XIT	XY	XI	XR	XC	XIC	XRC	XS	XSLL	XSL	XSH	XSHH			XALL	XAL	XAH	XAHH		XCV	XG	XL	
XV	VIBRATION	XVE	XVT		XVY	XVI	XVR				XVS			XVSH	XVSHH					XVAH	XVAHH				XVL	
Y	STATUS																									
Z	POSITION	ZE	ZT	ZIT	ZY	ZI					ZS												ZV		ZL	

* REFER TO OPERATOR PILOT DEVICE LEGEND

OPERATOR PILOT DEVICE LEGEND

DEVICE TYPE \ PILOT DEVICE FUNCTION	LOCAL-OFF-REMOTE (LOR)	STOP (SP)	START (ST)	HAND-OFF-AUTO (HOA)	OFF-ON (OO)	SELECT (SEL)	OPEN-STOP-CLOSE (OSC)	JOG OPEN-HOLD-CLOSE (JOHC)	SEMI/AUTO-AUTO-MANUAL (SAAM)	DUTY-STANDBY (DS)	JOG OPEN-JOG CLOSE (JOJC)	ONLINE-OFFLINE(OLOL)	AUTO-MANUAL (AM)	ON-OFF-REMOTE (OOR)	OPEN-CLOSE (OC)	NO OFFLINE-OFFLINE TRANSITION (NOOT)	LOW-HIGH (LH)	RESET (RST)	SPEED (SPD)	START-STOP (SS)	FORWARD (FWD)	REVERSE (REV)		EMERGENCY STOP (E-STOP)	SELECTION	POSITION (POS)(POT)
PILOT DEVICE TAG (HAND SWITCHES)	HSA	HSB	HSC	HSD	HSE	HSF	HSG	HSH	HSI	HSJ	HSK	HSL	HSM	HSN	HSO	HSP	HSQ	HSR	HSS	HST	HSU	HSV	HSW	HSX	HSY	HSZ
SCADA/HMI TAG (HAND ACTION)	HAA	HAB	HAC	HAD	HAE	HAF	HAG	HAH	HAI	HAJ	HAK	HAL	HAM	HAN	HAO	HAP	HAQ	HAR	HAS	HAT	HAU	HAV	HAW	HAX	HAY	HAZ

INSTRUMENT BUBBLE IDENTIFIERS



TYPICAL CONTROL PANEL DESCRIPTIONS
- PCM - PROCESS CONTROL MODULE NO.
- LCP - LOCAL CONTROL PANEL NO.
- VCP - VENDOR CONTROL PANEL NO.
- HMI - HUMAN MACHINE INTERACE NO.

TYPICAL POWER SOURCE LOCATIONS
- MCC - MOTOR CONTROL CENTER NO.
- LP - LIGHTING PANEL NO.
- PP - POWER PANEL NO.
- DP - DISTRIBUTION PANEL NO.
- LCP - LOCAL CONTROL PANEL NO.
- VCP - VENDOR CONTROL PANEL NO.
- PCM - PROCESS CONTROL MODULE NO.

TYPICAL PLC I/O FUNCTIONS
- DI - DISCRETE INPUT
- DO - DISCRETE OUTPUT
- AI - ANALOG INPUT
- AO - ANALOG OUTPUT
- RTD - RTD INPUT
- VDI - VIRTUAL DISCRETE INPUT
- VDO - VIRTUAL DISCRETE OUTPUT
- VAI - VIRTUAL ANALOG INPUT
- VAO - VIRTUAL ANALOG OUTPUT

TYPICAL POWER SOURCE FUNCTIONS
- TM - THERMAL MAGNETIC CIRCUIT BREAKER
- SS - SOLID STATE CIRCUIT BREAKER
- MCP - MOTOR CIRCUIT PROTECTOR
- FVNR - FULL VOLTAGE NON-REVERSING STARTER
- FVR - FULL VOLTAGE REVERSING STARTER
- PWS - PART-WINDING STARTER
- RVSS - REDUCED VOLTAGE SOLID STATE STARTER
- VFD - VARIABLE FREQUENCY DRIVE
- DISC - DISCONNECT

TYPICAL SCADA FUNCTIONS
- ACTION
- ALARM
- NUM - NUMERIC
- STATUS
- SP - SET POINT
- TREND

TYPICAL AUXILLARY EQUIPMENT FUNCTIONS
- MSH - MOISTURE SWITCH
- MWH - MOTOR WINDING HEATER
- TSH - TEMPERATURE SWITCH
- XVSH - VIBRATION SWITCH

INSTRUMENT LINE SYMBOLS

- INSTRUMENT OR CONNECTION TO PROCESS
- PNEUMATIC SYMBOL
- ELECTRIC SYMBOL
- HYDRAULIC SYMBOL
- CAPILLARY TUBE
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ELECTROMAGNETIC OR SONIC SIGNAL (NOT GUIDED)
- INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)
- COMMUNICATIONS LINK PLC TO MMI (SOFTWARE/HARDWARE)
- COPPER ETHERNET — C — C
- ETHERNET MODBUS TCP/IP —EMB—EMB—
- FIBER OPTIC ETHERNET
- WIRELESS ETHERNET
- PROFIBUS
- DEVICENET — DN — DN
- FOUNDATION FIELDBUS — FF — FF
- MECHANICAL LINK
- PNEUMATIC BINARY SIGNAL
- ELECTRIC BINARY SIGNAL OR

PROCESS LINE SYMBOLS

- PRIMARY PROCESS FLOW IN PIPE
- SECONDARY PROCESS FLOW IN PIPE
- PRIMARY PROCESS FLOW IN CHANNEL
- SECONDARY PROCESS FLOW IN CHANNEL

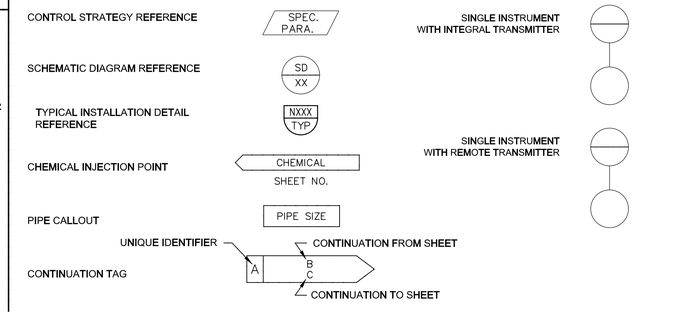
DESIGNATIONS

- FUTURE
- OR
- FUTURE
- VENDOR PACKAGED EQUIPMENT
- EXISTING
- OR
- EXISTING
- ADDITION OR NEW THIS CONSTRUCTION

ABBREVIATIONS

GENERAL ABBREVIATIONS	
DISC	DISCONNECT
HMI	HUMAN MACHINE INTERFACE
LCP	LOCAL CONTROL PANEL
LCS	LOCAL CONTROL STATION
MCB	MAIN CONTROL BOARD
MCC	MOTOR CONTROL CENTER
PCM	PROCESS CONTROL MODULE
PLC	PROGRAMMABLE LOGIC CONTROLLER
RIO	REMOTE INPUT/OUTPUT
SPD	SURGE PROTECTIVE DEVICE
SSG	SECONDARY SWITCHGEAR
UPS	UNINTERRUPTIBLE POWER SUPPLY
VCP	VENDOR CONTROL PANEL

MISCELLANEOUS P&ID SYMBOLS



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REV	DATE	BY	DESCRIPTION

DESIGNED MAG
DRAWN DVP
CHECKED EP
DATE JULY 2011

carollo

MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
INSTRUMENTATION
P&ID LEGEND

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

JOB NO. 7880I10
DRAWING NO. N-01

PROJECT NO. 7880I00 FILE NAME: 7880I10-00-N-001.dgn

P&ID SYMBOLS

VALVES

- AIR-RELIEF
- BALL
- BUTTERFLY
- DIAPHRAGM
- 4-WAY
- GATE
- GLOBE
- MUD
- NEEDLE
- PINCH
- PLUG ECCENTRIC
- THREE WAY PLUG
- 3-WAY

CHECK VALVES

- BACK FLOW PREVENTOR
- BALL
- DOUBLE FLAP
- FLAPPER
- DIAPHRAGM CHECK
- SWING
- GENERAL SPRING LOADED
- SWING SPRING LOADED

GATES

- SLIDE
- SLUICE
- STOP
- WEIR

PRESSURE VALVES

- BACKPRESSURE REG SELF CONTAINED
- BACKPRESSURE REG EXTERNAL TAP
- PRESSURE REDUCING SELF CONTAINED
- PRESSURE REDUCING EXTERNAL PRESSURE TAP
- REGULATING
- PRESSURE RELIEF
- VACUUM RELIEF

PIPING

- AIR GAP
- BLIND FLANGE
- CAPPED OR PLUGGED
- CONCENTRIC INCREASER
- CONCENTRIC REDUCER
- UNION
- DRAIN
- STRAINER WYE TYPE
- VENT TO ATMOSPHERE

ACTUATORS

- DIAPHRAGM
- E — ELECTRIC
- E/D — ELECTRIC DISCRETE
- E/M — ELECTRIC MODULATING
- E/P — ELECTRIC PNEUMATIC
- HAND
- S — SOLENOID

FLOW INSTRUMENTS

- MM — MAGNETIC
- PADDLE WHEEL
- ROTAMETER
- THERMAL
- ULTRASONIC DOPPLER
- ULTRA-SONIC TRANSIT TIME

LEVEL INSTRUMENTS

- CAPACITANCE
- TANK — DIFFERENTIAL PRESSURE
- ELECTRODE
- FLOAT
- RADAR PTOF
- RADAR TDR
- SUSPENDED
- ULTRASONIC

MISCELLANEOUS

- EXPANSION JOINT VIBRATION CENTER
- FLEXIBLE CONNECTION
- CAM LOCK FITTING
- HOSE CONNECTION
- AIR DAMPER
- AIR/CHEMICAL DIFFUSER
- ANNULAR SEAL
- BASKET STRAINER
- CALIBRATION-COLUMN
- DIAPHRAGM SEAL
- MANOMETER
- FILTER
- OR — PULSATION DAMPENER
- SAMPLE PORT
- SITE TUBE
- BLOW-OFF SILENCER
- GRINDER
- HORIZONTAL MIXER
- MIXER
- GAUGE
- BLOWER / FAN

PUMPS

- PERISTALTIC/HOSE
- PISTON
- PROGRESSIVE CAVITY/ POSITIVE DISPLACEMENT
- SUBMERSIBLE
- VERTICAL TURBINE
- M — CENTRIFUGAL
- CHEMICAL FEED DIAPHRAGM
- DIAPHRAGM

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
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JOB NO. 7880I10
DRAWING NO. N-02

PROJECT NO. 7880I00 FILE NAME: 7880I10-00-N-002.dgn

SCADA

CONTROL PANEL

PLC I/O

POWER SOURCE/FIELD

XAHH 401 ALARM TORQUE

JAH 401 ALARM O/L

KI 401 NUM ETM

Y1 401 STATUS RUNNING

XSHH 401 DI TORQUE PLC-35

JSH 401 DI O/L PLC-35

AUX1 401 DI RUNNING PLC-35

LCP 401

MS-401

FVNR

480VAC-3P

YAH 401 ALARM HORN

YAB 401 ALARM BEACON

HSR 401 RESET

HSB 401 START

HSA 401 LOS

YL 401 RUN

JAH 401 O/L

TAH 401 TEMP HIGH

HSP 401

XAHH 401 TORQUE HI-HI

CR3 401

XAH 401 TORQUE HIGH

ZAHH 401 SHEAR PIN BROKEN

ZSHH 401 SHEAR PIN

XSHH 401 TORQUE

TSH 401

CLR 401

PLANT WATER

PLW

ZE 401

S

TO SCUM PIT

A

S

A

ML

SECONDARY CLARIFIER NO.1
.75 HP 480VAC 3PH

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DATE JULY 2011

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MANATEE COUNTY

SWWRF CLARIFIER 1&2 REHABILITATION

INSTRUMENTATION

CLARIFIER NO.1 P&ID

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JOB NO. 7880I10

DRAWING NO. N-03

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SCADA

CONTROL PANEL

PLC I/O

POWER SOURCE/FIELD

XAHH 402 ALARM TORQUE

JAH 402 ALARM O/L

KI 402 NUM ETM

Y1 402 STATUS RUNNING

XSHH 402 DI TORQUE PLC-35

JSH 402 DI O/L PLC-35

AUX1 402 DI RUNNING PLC-35

LCP 402

MS-402

FVNR

480VAC-3P

YAH 402 ALARM HORN

YAB 402 ALARM BEACON

HSR 402 RESET

HSB 402 START

HSA 402 LOS

YL 402 RUN

JAH 402 O/L

TAH 402 TEMP HIGH

HSP 402

XAHH 402 TORQUE HI-HI

CR3 402

XAH 402 TORQUE HIGH

ZAHH 402 SHEAR PIN BROKEN

ZSHH 402 SHEAR PIN

XSHH 402 TORQUE

TSH 402

CLR 402

PLANT WATER

PLW

ZE 402

S

TO SCUM PIT

A

S

A

ML

SECONDARY CLARIFIER NO.2
.75 HP 480VAC 3PH

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SWWRF CLARIFIER 1&2 REHABILITATION

INSTRUMENTATION

CLARIFIER NO.2 P&ID

VERIFY SCALES
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JOB NO. 7880I10

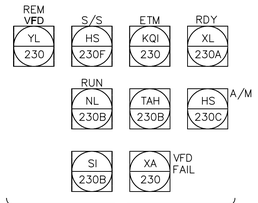
DRAWING NO. N-04

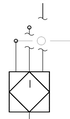
PROJECT NO. 7880I00 FILE NAME: 7880I10-00-N-004.dgn

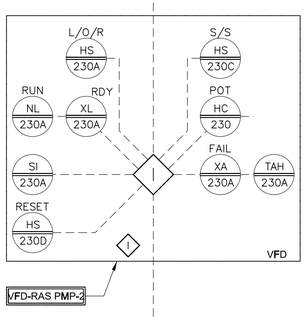
COMPUTER/HMI

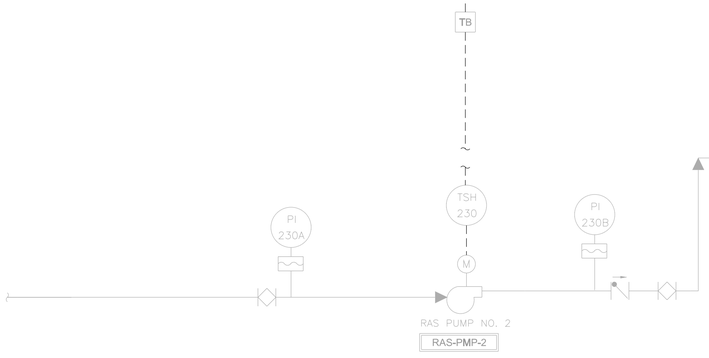
PLC

FIELD









NOTES:

1. SEE VFD SPECIFICATION FOR MORE DETAILED REQUIREMENTS.

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
INSTRUMENTATION
RAS PUMP NO.2 - P & ID - ADDITIONS

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JOB NO. 7880I10
DRAWING NO. N-05

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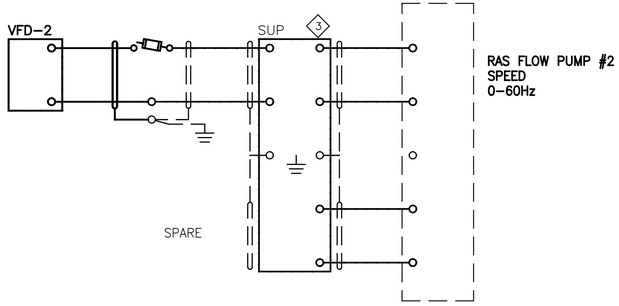
KEY NOTES:

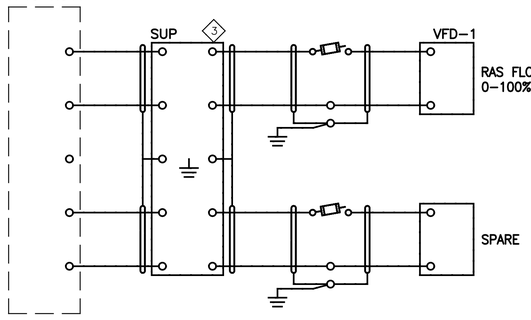
1. VERIFY EXISTING CONDITION AND TVSS DEVICES IN PLC CONTROL CABINET AND PROVIDE NEW INPUT/OUTPUT DEVICE TO MATCH EXISTING, AS NECESSARY FOR MONITORING AND CONTROL OF EQUIPMENT SHOWN IN P&ID DRAWINGS.
2. PROVIDE AUXILIARY CONTROL RELAYS (NOT SHOWN IN THIS DIAGRAM) FOR DISCRETE DIGITAL OUTPUTS ASSOCIATED WITH RAS PUMP NO.2.
3. PROVIDE SURGE SUPPRESSOR FOR ANALOG INPUTS/OUTPUTS EQUAL TO PHOENIX CONTACT PT2X2-24DC-ST, FOR CONTROL POINTS RELATED TO RAS PUMP NO.2.

EXISTING ANALOG INPUT MODULE
1746–NI8



RAS FLOW PUMP #2
SPEED
0–60Hz

EXISTING ANALOG OUTPUT MODULE
1746–N041



RAS FLOW CONTROL #2
0–100% SPEED

DISCRETE INPUT MODULE
1746–IB16

AD1192		
231	231SUP	SECONDARY CLARIFIER #1 RUN STATUS
232	1	SECONDARY CLARIFIER #1 HIGH TORQUE STATUS
233	233SUP	CLARIFIER #1 FAIL
234	1	SPARE
235	235SUP	SPARE
236		SPARE
237	237SUP	SPARE
238		SPARE
AD1202		
239	239SUP	RAS PUMP #2 RUN
240		RAS PUMP #2 READY
241	241SUP	RAS PUMP #2 FAIL
242		RAS PUMP #2 HIGH TEMP
243	243SUP	
244		
245	245SUP	
246		
247	DC–COM	
248	DC–COM	
249		
250		
251		

* SENSE VOLTAGE SUPPLIED BY SCADA PANEL 24VDC POWER SUPPLY

EXISTING DISCRETE INPUT MODULE
1746–IB16

AD1212		
261	261SUP	SECONDARY CLARIFIER NO.2 RUN STATUS
262	1	SECONDARY CLARIFIER NO.2 HIGH TORQUE STATUS
263	263SUP	SECONDARY CLARIFIER NO.2 FAIL STATUS
264	1	SPARE
265	265SUP	SPARE
266		SPARE
267	267SUP	SPARE
268		SPARE
AD1222		
269	269SUP	SCUM PUMP #1 RUN
270		SCUM PUMP #1 FAIL
271	271SUP	SCUM PUMP #2 RUN
272		SCUM PUMP #2 FAIL
273	273SUP	SPARE
274		SPARE
275	275SUP	SPARE
276		SPARE
277	DC–COM	
278	DC–COM	
279		
280		
281		

* SENSE VOLTAGE SUPPLIED BY SCADA PANEL 24VDC POWER SUPPLY

LEGEND

NEW

EXISTING

REV	DATE	BY	DESCRIPTION

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MANATEE COUNTY
SWWRF CLARIFIER 1&2 REHABILITATION
INSTRUMENTATION
CONTROLS TERMINATION
AT SCADA CABINET "SP-1"

VERIFY SCALES
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JOB NO. 7880I10
DRAWING NO. N-06

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