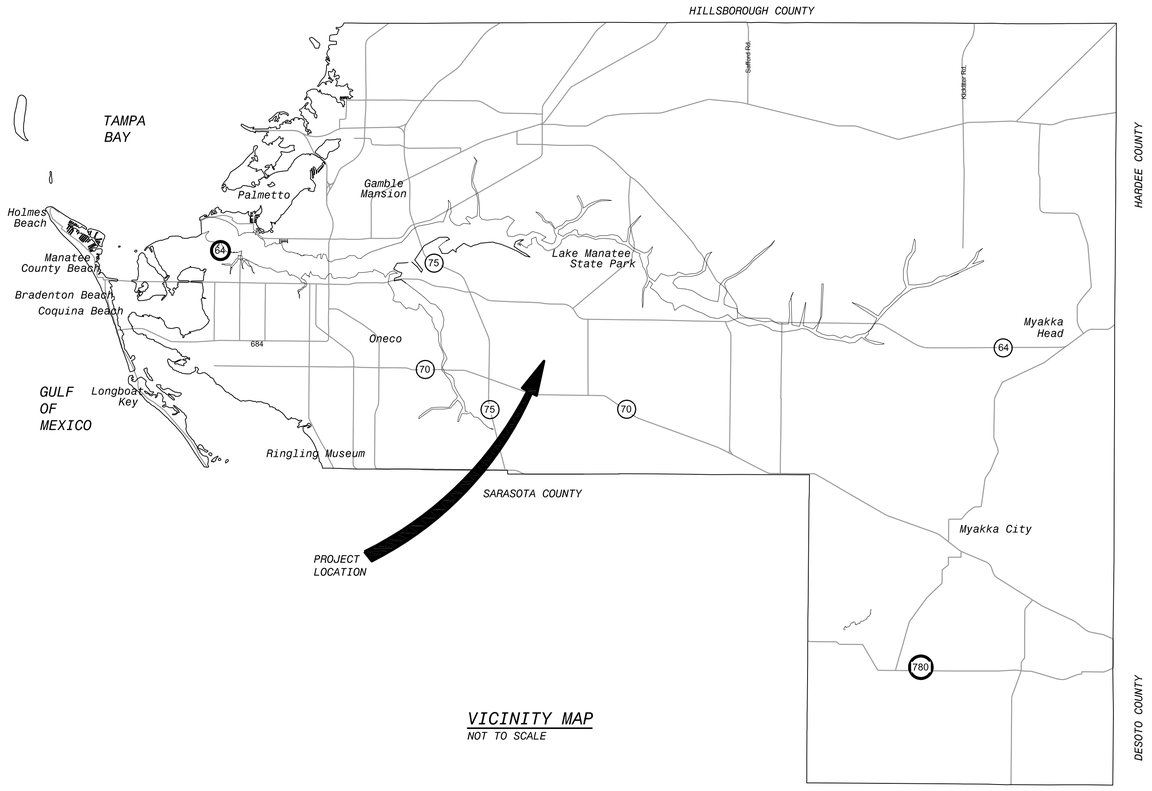
MANATEE COUNTY
SOUTHEAST WATER RECLAMATION FACILITY (SEWRF)
RAS /WAS SYSTEM UPGRADE



VICINITY MAP
NOT TO SCALE

PROJECT LOCATION
MANATEE COUNTY SOUTHEAST
REGIONAL WATER RECLAMATION FACILITY

100% SUBMITTAL
FEBRUARY 2019

BLACK & VEATCH

Black & Veatch Corporation
3405 W. Dr. M. L. King Jr. Blvd, Suite 125
Tampa, Florida Certificate No. 8132

MICHAEL N. TACKE
LICENSE
No 83893
STATE OF FLORIDA
PROFESSIONAL ENGINEER

MANATEE COUNTY CIP # 6092180
BLACK & VEATCH PROJECT # 198898

SHEET	DRAWING NO.	DRAWING TITLE
GENERAL		
1	-	COVER SHEET
2	G-01	GENERAL - INDEX OF DRAWINGS
3	G-02	GENERAL - NOTES, LEGEND AND ABBREVIATIONS
4	G-03	GENERAL - SITE LAYOUT
DEMOLITION		
5	D-01	DEMOLITION - RAS/WAS PUMP STATION - PLAN AND SECTION
6	D-02	DEMOLITION - PNEUMATIC SCUM EJECTORS - PLAN AND SECTIONS
STRUCTURAL		
7	S-01	STRUCTURAL - NOTES
8	S-02	STRUCTURAL - DETAILS
MECHANICAL		
9	M-01	MECHANICAL - RAS/WAS PUMP STATION - PLAN
10	M-02	MECHANICAL - RAS/WAS PUMP STATION - SECTIONS
11	M-03	MECHANICAL - SCUM PUMPS - PLAN AND SECTIONS
12	M-04	MECHANICAL - DETAILS
ELECTRICAL		
13	E-01	ELECTRICAL - LEGEND
14	E-02	ELECTRICAL - ABBREVIATIONS AND NOTES
15	E-03	ELECTRICAL - SITE PLAN
16	E-04	ELECTRICAL - DUCT BANK SECTION AND SCHEDULE
17	E-05	ELECTRICAL - MCC-1A POWER ONE-LINE DIAGRAM
18	E-06	ELECTRICAL - MCC-2A POWER ONE-LINE DIAGRAM
19	E-07	ELECTRICAL - MCC-11 AND MCC-12 POWER ONE-LINE DIAGRAMS
20	E-08	ELECTRICAL - CONTROL ONE-LINES
21	E-09	ELECTRICAL - SCHEMATICS
22	E-10	ELECTRICAL - RAS/WAS PUMP STATION - POWER & LIGHTING PLAN
23	E-11	ELECTRICAL - DEMOLITION - RAS/WAS PUMP STATION AND FLOW SPLITTER BOX LIGHTING PLAN
24	E-12	ELECTRICAL - SCUM PUMP STATION - POWER PLAN
25	E-13	ELECTRICAL - ELECTRICAL BUILDING NO.1 POWER PLAN
26	E-14	ELECTRICAL - ELECTRICAL BUILDING NO.2 POWER PLAN
27	E-15	ELECTRICAL - SPLITTER BOX GATES - POWER AND LIGHTING PLAN
28	E-16	ELECTRICAL - TYPICAL DETAILS
29	E-17	ELECTRICAL - SINGLE LINE DIAGRAM
INSTRUMENTATION		
30	I-01	INSTRUMENTATION - LEGEND & ABBREVIATIONS - SHEET 1 OF 3
31	I-02	INSTRUMENTATION - LEGEND & ABBREVIATIONS - SHEET 2 OF 3
32	I-03	INSTRUMENTATION - LEGEND & ABBREVIATIONS - SHEET 3 OF 3
33	I-04	P&ID - SCUM PUMP STATION, CLARIFIERS 1-4
34	I-05	INSTRUMENTATION - INSTALLATION DETAILS
35	I-06	INSTRUMENT - NETWORK BLOCK DIAGRAM

NO.	BY	CK APP
D	AD	RE MT
C	AD	RE MT
B	AD	RE MT
A	AD	RE MT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL
JULY 2018	30% SUBMITTAL

50.3040 - General Drawings
G-01.dwg

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XREF1:
XREF2:
XREF3:
XREF4:

MICHAEL N. TACHE LICENSE No 83893 STATE OF FLORIDA PROFESSIONAL ENGINEER

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

GENERAL
INDEX OF DRAWINGS

DESIGNED: RE
DETAILED: AD
CHECKED: BV
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

G-01
SHEET
02 OF 35

FD7000
198898

GENERAL

1. THESE GENERAL NOTES SHALL APPLY TO ALL DRAWINGS INCLUDED IN THE CONTRACT.

2. COORDINATES INDICATED ON THE DRAWINGS ARE FLORIDA STATE PLANE COORDINATE SYSTEM. NORTH AMERICAN DATUM OF 1983. ELEVATIONS INDICATED ON THE DRAWINGS ARE BASED ON A NATIONAL GEODETIC VERTICAL DATUM, 1929.

3. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN EXCAVATING. PIPING AND UTILITY LOCATIONS SHOWN ON PLANS ARE NOT EXACT OR GUARANTEED. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING EXISTING UTILITY LOCATIONS.

4. EXISTING UTILITIES AND STRUCTURES (UNDERGROUND, SURFACE, OR OVERHEAD) ARE INDICATED ONLY TO THE EXTENT THAT SUCH INFORMATION WAS KNOWN, OR MADE AVAILABLE TO, OR DISCOVERED BY THE ENGINEER IN PREPARING THE DRAWINGS. THE LOCATIONS, CONFIGURATIONS, AND ELEVATIONS OF SUBSURFACE FACILITIES AND UTILITIES ARE APPROXIMATE, AND NOT ALL UTILITIES AND FACILITIES ARE INDICATED. THE CONTRACTOR SHALL VERIFY THE EXACT HORIZONTAL AND VERTICAL LOCATION OF UNDERGROUND UTILITIES IN THE AREA OF CONSTRUCTION PRIOR TO PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS AND PAY ALL COSTS ASSOCIATED WITH THE TEMPORARY RELOCATION, SUPPORT, MONITORING, PROTECTION, OR OTHER INTERACTION WITH UTILITY FEATURES WHICH MIGHT BE AFFECTED BY THE WORK. PROVIDE REQUIRED NOTICE TO OTHERS FOR SUCH WORK TO ALLOW THE PROJECT TO CONTINUE IN ACCORDANCE WITH THE CONTRACT SCHEDULE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MIGHT RESULT FROM HIS FAILURE TO ADEQUATELY LOCATE AND PROTECT ANY AND ALL UTILITIES, WHETHER ABOVE OR BELOW GRADE. ANY DAMAGE SHALL BE REPAIRED AT NO ADDITIONAL COST TO OWNER.

5. "SCREENED" (LIGHT) DELINEATION INDICATED ON THE DRAWINGS DENOTES EXISTING FACILITIES. "SCREENED" INFORMATION WAS TAKEN FROM EXISTING CONSTRUCTION DRAWINGS AND DATA, AND IS FOR REFERENCE ONLY, AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO THE ORDERING OF MATERIALS AND BEGINNING OF CONSTRUCTION. "BOLD" DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.

6. THE TERM "PROPOSED" AS INDICATED ON THE DRAWINGS MEANS THE ITEM IS DESIGNED OR PLANNED TO BE PROVIDED BY OWNER OR OTHERS SEPARATE FROM THIS CONTRACT. THE TERM "FUTURE" AS INDICATED ON THE DRAWINGS REFERS TO THE ENGINEER'S INTERPRETATION OF THE ITEM FOR THE FUTURE, BASED ON AVAILABLE INFORMATION.

7. CONTRACTOR SHALL ADJUST VALVE BOXES, AIR RELEASE VALVES, FIRE HYDRANTS, MANHOLES, MANHOLE COVERS, ETC IN CONFLICT WITH NEW WORK.

8. OWNER SHALL OPERATE WATER, WASTEWATER, AND RECLAIMED WATER VALVES. COORDINATE VALVE OPERATION WITH OWNER.

9. CONTRACTOR SHALL PROTECT EXISTING INFRASTRUCTURE / EQUIPMENT FROM DAMAGE DURING THE DURATION OF CONSTRUCTION. THE CONTRACTOR, AT THE CONTRACTOR'S EXPENSE, SHALL IMMEDIATELY REPAIR ALL DAMAGES TO UTILITIES, MAINS AND FACILITIES. IF THE REPAIR IS NOT MADE IN A TIMELY MANNER, AS DETERMINED BY OWNER, OWNER MAY PERFORM REQUIRED REPAIRS AND CLEANUP. THE CONTRACTOR WILL BE CHARGED FOR ALL EXPENSES ASSOCIATED WITH THE REPAIR.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL SURVEY BENCHMARKS. SURVEY BENCHMARKS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REESTABLISHED BY A LAND SURVEYOR LICENSED IN THE STATE OF FLORIDA.

11. CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING TREES, SHRUBS, AND PLANTS, UNLESS OTHERWISE NOTED.

12. CONTRACTOR SHALL NOT ADVERSELY IMPACT DRAINAGE SYSTEMS DURING CONSTRUCTION. TEMPORARILY RECONFIGURE THE DRAINAGE SYSTEM, AS NEEDED AS THE CONSTRUCTION WORK PROGRESSES, TO NOT CAUSE ADVERSE IMPACTS TO SURFACE WATER DRAINAGE EFFICIENCY. DO NOT IMPAIR SURFACE WATER DRAINAGE CAPACITY. FOLLOW THE REQUIREMENTS OF THE APPROVED POLLUTION PREVENTION PLAN FOR THE PROJECT.

13. CONTRACTOR SHALL RETURN THE ENTIRE AREA DISTURBED BY CONSTRUCTION ACTIVITIES TO THE ORIGINAL CONDITION OR BETTER UPON COMPLETION OF THE WORK, IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. GRADE SHALL BE RETURNED TO ORIGINAL ELEVATION. THE ENTIRE DISTURBED AREA OF ALL ESTABLISHED LAWN AREAS SHALL BE SEEDED.

14. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES ADJACENT TO THE WORK THROUGHOUT THE PERIOD OF CONSTRUCTION, AND AT NO TIME SHALL HIS OPERATIONS BLOCK OR RESTRICT ACCESS TO PLANT STAFF WITHOUT ADVANCED NOTIFICATION AND APPROVAL.

15. THE CONTRACTOR SHALL NOTIFY THE OWNER PRIOR TO CONNECTING TO OR DISRUPTING ANY EXISTING SERVICES (PIPING, ELECTRICAL, ETC).

16. CONTRACTOR SHALL FIELD VERIFY PRECISE LOCATION, ELEVATION, AND ARRANGEMENT OF CONNECTIONS OF NEW PIPELINES WITH EXISTING PIPELINES BASED ON FIELD CONDITIONS, PRIOR TO FABRICATING NEW PIPING. CONTRACTOR SHALL PROVIDE FITTINGS, ADAPTERS, SOLID SLEEVE CLOSURES, AND HARNESSED MECHANICAL COUPLING; ROTATE FITTINGS; DEFLECT JOINTS; AND MODIFY EXISTING PIPING AS APPLICABLE AND AS REQUIRED TO MAKE CONNECTIONS, INCLUDING ADJUSTMENTS FOR ANY OFFSETS IN CENTERLINE ELEVATIONS BETWEEN PIPELINES. CONTRACTOR SHALL PROVIDE TEMPORARY PLUG WITH FACTORY OUTLET SIZED AS REQUIRED FOR CONTRACTOR'S TESTING AND DISINFECTION WORK BEFORE MAKING CONNECTION, WHEN APPLICABLE. CONTRACTOR SHALL COORDINATE EACH TIE-IN WITH THE OWNER.

17. RESTRAINED JOINTS SHALL BE PROVIDED FOR ALL PIPING.

18. FOR ALL SITE GRADING, SMOOTH PARBOLIC TRANSITIONS SHALL BE MADE BETWEEN CHANGES IN SLOPE. PARABOLIC ROUNDING SHALL APPLY TO ALL CUT AND FILL SECTIONS.

19. ALL DIRECTION CHANGES IN DIP BOTH HORIZONTAL AND VERTICAL SHALL BE BY JOINT DEFLECTION. JOINT DEFLECTION IN DIP SHALL NOT EXCEED 75% OF THE MANUFACTURER'S RECOMMENDED DEFLECTION. NO JOINT DEFLECTION OR PIPE BENDING IS ALLOWED FOR PVC PIPE. THE MAXIMUM ALLOWABLE TOLERANCE IN THE JOINT DUE TO VARIANCES IN INSTALLATION IS 0.75 DEGREES (3-INCHES PER JOINT PER 20-FOOT STICK OF PIPE). NO BENDING TOLERANCE IN THE PIPE BARREL SHALL BE ACCEPTABLE. ALIGNMENT CHANGE SHALL BE MADE ONLY WITH SLEEVES AND FITTINGS.

20. NO WATER FROM TEMPORARY DE-WATERING OPERATIONS SHALL BE DISCHARGED IN A LOCATION OR MANNER WHICH WILL CAUSE THE TRANSFER OF SEDIMENT INTO DITCHES OR OTHER WETLAND AREAS.

21. THE SOIL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE INSTALLED PRIOR TO CONSTRUCTION, MAINTAINED THROUGHOUT CONSTRUCTION AND UNTIL THE SITE IS PERMANENTLY STABILIZED. THE CONTRACTOR SHALL PROVIDE AND INSTALL SILT SCREENS AROUND THE PROPOSED CONSTRUCTION ACTIVITY, AS NECESSARY, TO PREVENT THE TRANSPORT OF SEDIMENT DOWNSTREAM INTO STREET, STORM SEWERS, OPEN DITCHES, LAKES, DETENTION PONDS, ETC., AND SHALL PERFORM ALL NECESSARY INSPECTIONS AT A MINIMUM, SILT FENCING SHALL BE INSTALLED AT THE LOCATIONS INDICATED ON THE DRAWINGS.

22. THE CONTRACTOR SHALL DEVELOP A STORM WATER POLLUTION PLAN (SWPP) AND APPOINT A DESIGNATED SWPP INSPECTOR FOR THE PROJECT SITE. THE CONTRACTOR SHALL PAY FOR AND FILE A NOTICE OF INTENT TO USE THE STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION GENERIC PERMIT FOR STORM WATER DISCHARGE FROM LARGE AND SMALL CONSTRUCTION ACTIVITIES (HENCEFORTH REFERRED AS "FDEP GENERIC PERMIT") AT LEAST ONE WEEK PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL FILE A NOTICE OF TERMINATION TO USE THE FDEP GENERIC PERMIT AT THE COMPLETION OF THE PROJECT.

23. THE CONTRACTOR SHALL REMOVE AND LEGALLY DISPOSE OF ALL SURPLUS MATERIALS AND DEBRIS FROM THE SITE AND SHALL MAINTAIN THE SITE IN A NEAT AND ORDERLY CONDITION.

24. THE DRAWINGS INDICATE TYPES OF PIPE SUPPORT SYSTEMS AT VARIOUS LOCATIONS. HOWEVER, ALL PIPE SUPPORTS, HANGERS, BRACKETS, INSERTS OR BRACES ARE NOT SHOWN. CONTRACTOR SHALL REFER TO SPECIFICATION 15140 REQUIREMENTS AND PROVIDE A COMPLETE SUPPORT SYSTEM AS REQUIRED.

25. AT A MINIMUM, CONTRACTOR SHALL NOTIFY OWNER TWENTY-ONE (21) DAYS IN ADVNACE OF TIE-ING INTO EXISTING FACILITIES / PIPING.

26. UNLESS ADDITIONAL SPACE IS APPROVED BY OWNER, CONTRACTOR'S STAGING, PARKING AND MATERIAL STORAGE SHALL BE LIMITED TO THE LOCATION(S) INDICATED ON THE DRAWINGS. PROVIDING ADDITIONAL STORAGE AREAS OR PARKING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

ABBREVIATIONS

ALT	ALTERNATE, (IVE)
APPROX	APPROXIMATE, (LY)
AWG	AMERICAN WIRE GAGE
BF	BLIND FLANGE
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BM	BENCHMARK
BV	BALL VALVE
CFM	CUBIC FEET PER MINUTE
C&G	CURB AND GUTTER
CI	CAST IRON
CIP	CAST IRON PIPE
C/L	CENTERLINE
CONT	CONTINUOUS, CONTINUATION
CPLG	COUPLING
CTR(S)	CENTER(S)
CV	CHECK VALVE
CW	COLD WATER
DI	DUCTILE IRON
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DMJ	DISMANTLING JOINT
DN	DOWN
DR	DRAIN
DWG(S)	DRAWING(S)
E	EAST
EA	EACH
ECC	ECCENTRIC
EFF	EFFLUENT
EL	ELEVATION
EQ	EQUAL
EQUIP	EQUIPMENT
EXIST	EXISTING
FCA	FLANGED COUPLING ADAPTER
FH	FIRE HYDRANT
FIN	FINISHED
FL	FLOOR
FLEX	FLEXIBLE
FLG	FLANGE
FM	FORCE MAIN
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FOOT
FWD	FORWARD
G	GAS
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GR	GRADE
GV	GATE VALVE
HB	HOSE BIBB
HF	HOSE FAUCET
HMC	HARNESSED MECHANICAL COUPLING
HORIZ	HORIZONTAL
HP	HORSEPOWER
HW	HOT WATER
HWY	HIGHWAY
ID	INSIDE DIAMETER
IN	INCHES
INC	INCORPORATED
INV	INVERT
LAT	LATERAL
LBR	LIMEROCK BEARING RATIO
LB(S)	POUNDS
LOC	LIMITS OF CONSTRUCTION
LT	LEFT
MAX	MAXIMUM
MFM	MAGNETIC FLOWMETER
MFR(S)	MANUFACTURER(S)
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
N	NORTH
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
N.O.	NORMALLY OPEN
NO.(S)	NUMBER(S)
NPT	NATIONAL PIPE THREAD
NPW	NONPOTABLE WATER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OVERFLOW
OH	OVERHEAD
OZ	OUNCE
PE	PLAIN END
POLY	POLYMER
PP	POWER POLE
PRV	PRESSURE REDUCING VALVE
PS	PIPE SUPPORT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVCP	POLYVINYL CHLORIDE PIPE
PVMT	PAVEMENT
PW	POTABLE WATER
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RED	REDUCER, REDUCING
REQD	REQUIRED
RPM	REVOLUTIONS PER MINUTE
RT	RIGHT
R/W	RIGHT OF WAY
S	SOUTH
SCH	SCHEDULE
SIM	SIMILAR
SPEC(S)	SPECIFICATION(S)
SQ	SQUARE
SS	SANITARY SEWER
ST SWR	STORM SEWER
STA	STATION
STD	STANDARD
SYM	SYMMETRICAL
SYS	SYSTEM
RAS	RETURN ACTIVATED SLUDGE
WAS	WASTE ACTIVATED SLUDGE
T	TOP
TBM	TEMPORARY BENCHMARK
TH	TEST HOLE
TV	TELEVISION
TYP	TYPICAL
UDM	ULTRASONIC DENSITY METER
UGND	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
USGS	UNITED STATES GEOLOGICAL SURVEY
V	VALVE, VENT
VCP/VC	VITRIFIED CLAY PIPE
VERT	VERTICAL
VR	AIR/VACUUM RELEASE VALVE
VV	VENT VALVE
W	WEST, WATER
W/	WITH
WL	WATER LEVEL
WM	WATER METER
W/O	WITHOUT
WT	WEIGHT
WW	WET WELL
x	BY,TIMES
YH	YARD HYDRANT
&	AND
@	AT
°	DEGREE
<	DEFLECTION ANGLE
#	NUMBER
%	PER CENT

NEW PIPING

UNDERGROUND PIPING

EXISTING PIPING

SMALLER THAN 24" / 24" AND LARGER — EXISTING

GENERAL LAYOUT YARD PIPING

SMALLER THAN 24" / 24" AND LARGER — NEW

PROPERTY LINE

EASEMENT LINE

FENCE

CENTERLINE

SILT FENCE

(G) / (W) — WATER OR GAS VALVE

(WM) / (GM) — WATER OR GAS METER

TELEPHONE OR POWER POLE WITH GUY ANCHOR

MANHOLE (MH)

FH — FIRE HYDRANT (FH)

Y — YARD, POST HYDRANT (YH)

STREET LIGHT POLE

HEDGE, BRUSH, SHRUBS, WOODS

10" — DECIDUOUS TREE AND TRUNK DIAMETER

4" — CONIFEROUS TREE AND TRUNK DIAMETER

SWAMP

1 / AC45 — SECTION NUMBER OR DETAIL LETTER; DRAWING NUMBER ON WHICH SECTION OR DETAIL APPEARS; OR WHERE SECTION IS CUT OR DETAIL IS NOTED

DEMOLISH AND DISPOSE

326 — EXISTING GROUND CONTOUR

326 — FINISH GRADE CONTOUR

DRAINAGE ARROW (FLOW DIRECTION)

X 57.50 — EXISTING SPOT ELEVATION

XX.X — PROPOSED SPOT ELEVATION

MATERIALS LEGEND

EARTH OR GRADE

GRANULAR FILL (CRUSHED STONE OR GRAVEL)

ROCK

CONCRETE

ASPHALT

GRANITE ROCK

NO.	BY	CK APP
A	AD	RE MT
B	AD	RE MT
C	AD	RE MT
D	AD	RE MT

REVISIONS AND RECORD OF ISSUE

DATE	
JULY 2018	30% SUBMITTAL
SEPT 2018	60% SUBMITTAL
NOV 2018	90% SUBMITTAL
FEB 2019	100% SUBMITTAL

50.3040 - General Drawings

G-02.dwg

XREF1:
XREF2:
XREF3:
XREF4:

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USER:AC995836 DWG VER:T007

MICHAEL N. TACHE ★ LICENSE ★ STATE OF FLORIDA ★ ENGINEER ★ PROFESSIONAL
No 83993

BLACK & VEATCH
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Tampa, Florida Certificate No. 8132

MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

GENERAL
NOTES, LEGEND AND ABBREVIATIONS

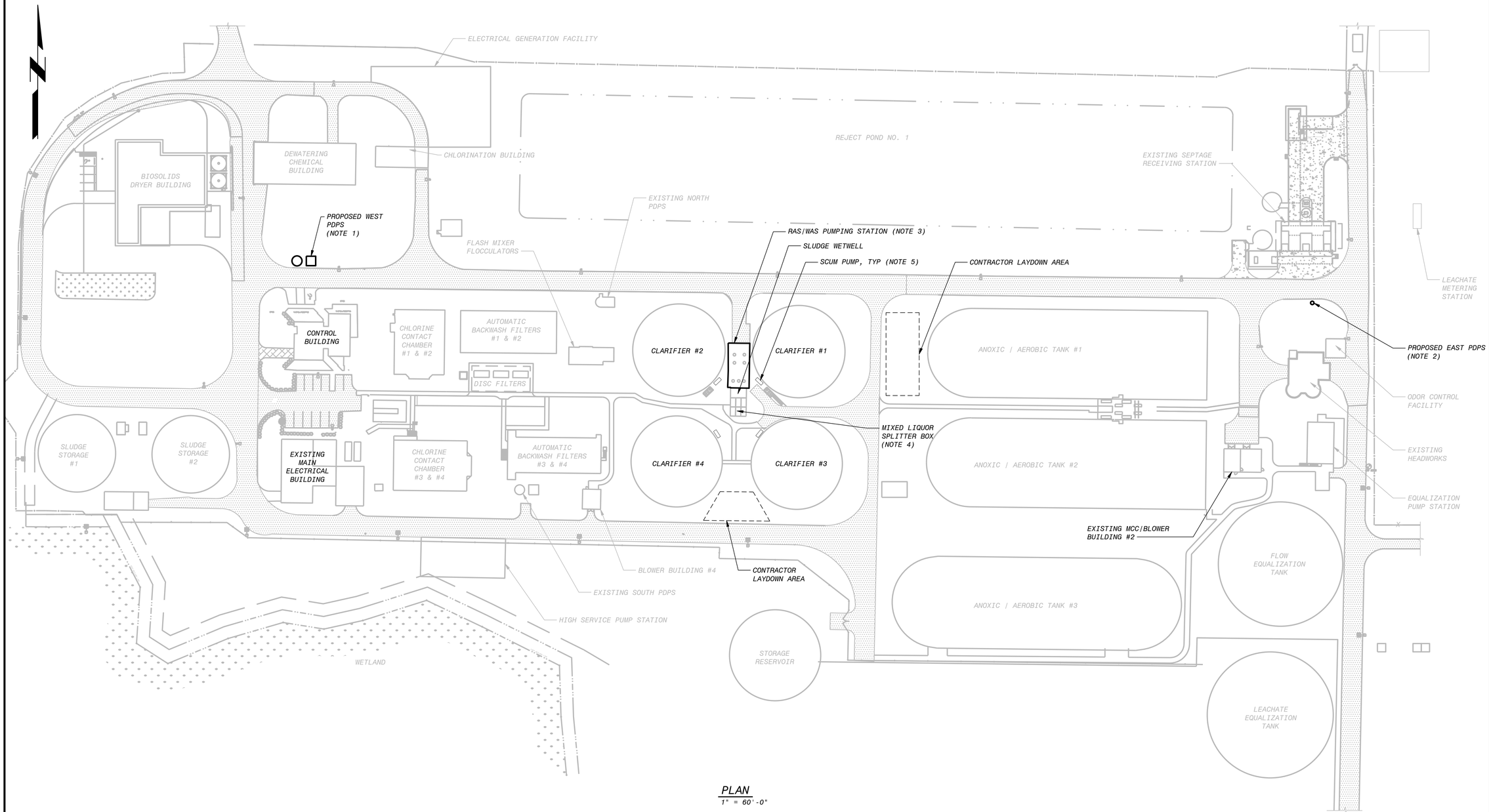
DESIGNED: RE
DETAILED: AD
CHECKED: BV
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

G-02
SHEET
03 OF 35

FD7000
198898



PLAN
1" = 60'-0"

60' 30' 0 60' 120'
1"=60'

NOTES:

1. PROPOSED WEST PLANT DRAIN PUMP STATION AND ASSOCIATED PIPING AND APPURTENANCES ARE BEING INSTALLED UNDER A SEPARATE CONTRACT (PLANT DRAIN PUMP STATION DESIGN PROJECT).
2. PROPOSED EAST PLANT DRAIN PUMP STATION IS BEING INSTALLED UNDER A SEPARATE CONTRACT (PLANT DRAIN PUMP STATION DESIGN PROJECT).
3. REFER TO DRAWINGS M-01 AND M-02 FOR MECHANICAL LAYOUTS FOR THE RAS AND WAS PUMP STATIONS.
4. MANUAL GATE ACTUATORS AT SPLITTER BOX ARE BEING REPLACED WITH ELECTRIC ACTUATORS AND LOCAL CONTROL STATION. REFER TO ELECTRICAL DRAWINGS.
5. A NEW SCUM PUMP IS BEING INSTALLED FOR EACH CLARIFIER. REFER TO DRAWING M-03.

NO.	BY	CK	APP
C	AD	RE	MT
B	AD	MM	MT
A	AD	MM	MT

REVISIONS AND RECORD OF ISSUE

DATE	
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL
JULY 2018	30% SUBMITTAL

50.3040 - General Drawings
G-03.dwg
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XREF1:
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XREF3:
XREF4:

MICHAEL T. ACHE LICENSE No 83983 STATE OF FLORIDA PROFESSIONAL ENGINEER

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Tampa, Florida
Certificate No. 8132

MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS /WAS SYSTEM UPGRADE

GENERAL SITE LAYOUT

DESIGNED: CM
DETAILED: AD
CHECKED: MM
APPROVED: MT
DATE: NOVEMBER 2018

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IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

G-03
SHEET
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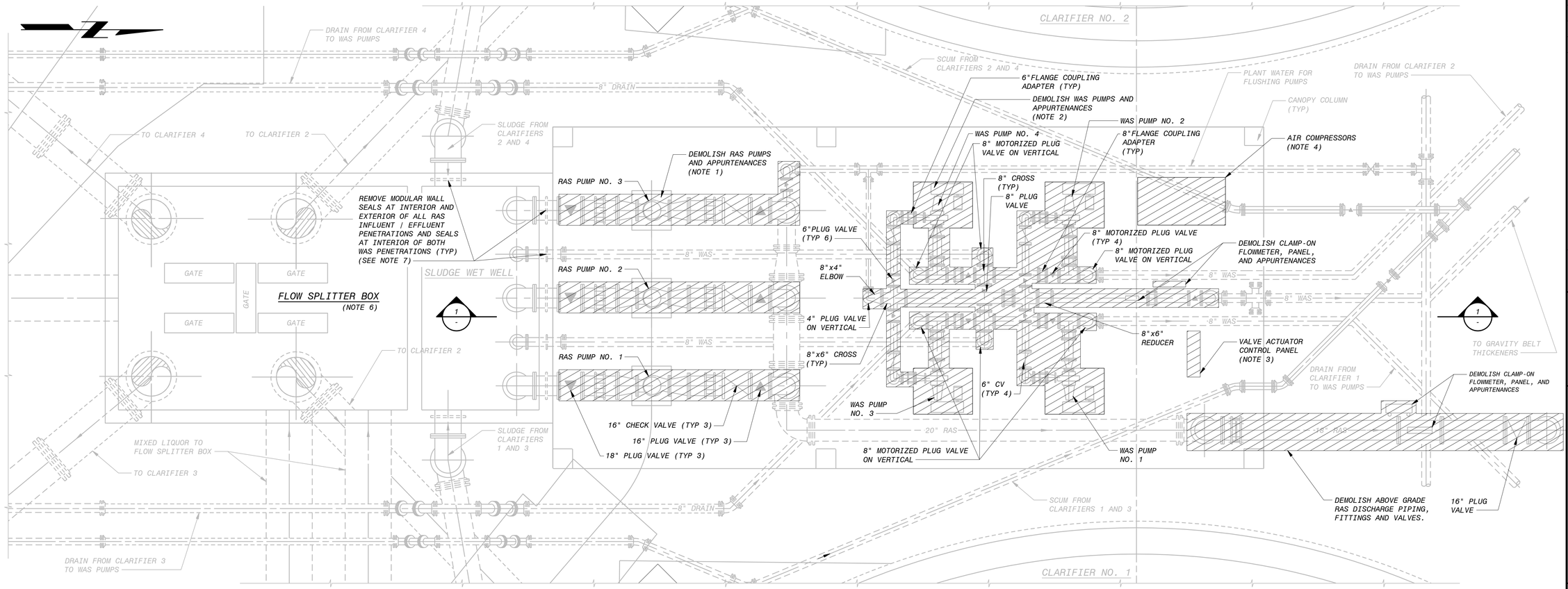


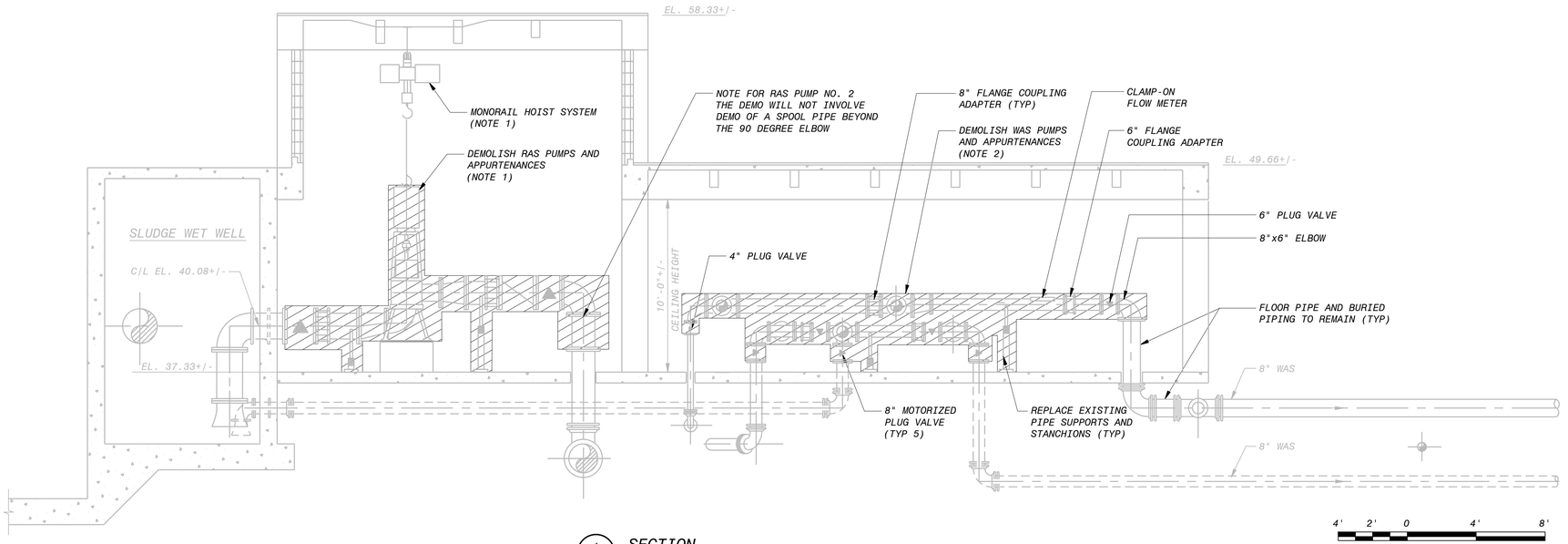
PLAN
1/4" = 1'-0"

LEGEND:

DEMOLITION WORK

NOTES:

1. DEMOLISH EXISTING RAS PUMPS AND ABOVE GRADE VALVES, PIPING AND APPURTENANCES FROM WALL PIPE AT SLUDGE WET WELL TO FLOOR PIPE ON RAS PUMP DISCHARGE SPOOL. TYPICAL FOR ALL THREE RAS PUMPS. PUMP EQUIPMENT PADS SHALL REMAIN AND BE PROTECTED DURING DEMOLISH AND CONSTRUCTION ACTIVITIES. WITH ADVANCED COORDINATION WITH THE COUNTY, CONTRACTOR MAY USE EXISTING HOIST SYSTEM FOR DEMOLISHING EXISTING RAS PUMPS. CONTRACTOR TAKES ALL RESPONSIBILITY FOR ENSURING THE HOIST IS SUITABLE FOR WORK AND IS IN GOOD WORKING ORDER.
2. DEMOLISH EXISTING WAS PUMPS AND ABOVE GRADE VALVES, PIPING AND APPURTENANCES AS SHOWN. PUMP EQUIPMENT PADS SHALL REMAIN AND BE PROTECTED DURING DEMOLISH AND CONSTRUCTION ACTIVITIES.
3. DEMOLISH EXISTING CONTROL PANEL FOR WAS SYSTEM MOTORIZED PLUG VALVES. BURIED PIPING AND CONDUITS SHALL BE CUT FLUSH WITH FINISHED FLOOR, CAPPED AND ABANDONED IN PLACE.
4. DEMOLISH EXISTING AIR COMPRESSOR WHICH OPERATES THE PNEUMATIC SCUM EJECTORS. ABOVE GRADE PIPING, VALVES, AND APPURTENANCES ASSOCIATED WITH THE AIR SYSTEM SHALL ALSO BE DEMOLISHED.BURIED PIPING AND CONDUITS SHALL BE CUT FLUSH WITH FINISHED FLOOR OR GRADE ELEVATION, CAPPED AND ABANDONED IN PLACE.
5. EXISTING LIGHTS UNDER RAS/WAS PUMP STATION CANOPY SHALL BE REPLACED WITH LED FIXTURES. REFER TO ELECTRICAL DRAWINGS FOR DETAILS.
6. CONTRACTOR SHALL REMOVE MANUAL ACTUATORS FOR THE FIVE GATES LOCATED AT THE OPERATING DECK OF THE FLOW SPLITTER BOX AND REPLACE WITH NEW ELECTRIC ACTUATORS IN ACCORDANCE WITH THE ELECTRICAL DRAWINGS AND SPECIFICATIONS.
7. CONTRACTOR TO REMOVE MODULAR WALL PENETRATION SEALS AT BOTH 24" RAS INFLUENT LOCATIONS, AND AT THE THREE 18" RAS OUTLET LOCATIONS, AS SHOWN. BOTH INTERIOR AND EXTERIOR SEALS SHALL BE REMOVED AT EACH LOCATION. CONTRACTOR TO REMOVE SEALS AT BOTH WAS OUTLET LOCATIONS (INTERIOR SEALS ONLY).CONTRACTOR SHALL COORDINATE TO HAVE THIS WORK COMPLETED, ALONG WITH REPLACING WITH NEW MODULAR WALL SEALS, WHILE SLUDGE WET WELL IS DRAINED FOR WORK SEQUENCE ASSOCIATED WITH THE REPLACEMENT OF RAS/WAS PUMPS AND PIPING.
8. REFER TO SPECIFICATION ON CONSTRUCTION CONSTRAINTS THAT MUST BE FOLLOWED TO AVOID ADVERSELY IMPACTING PLANT OPERATIONS DURING DEMO ACTIVITIES.



1 D-01 SECTION
1/4" = 1'-0"

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C	AD	MM	MT	NOV 2018	90% SUBMITTAL
B	AD	MM	MT	SEPT 2018	60% SUBMITTAL
A	AD	MM	MT	JULY 2018	30% SUBMITTAL

50.3040 - General Drawings
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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

DEMOLITION
RAS/WAS PUMP STATION
PLAN AND SECTION

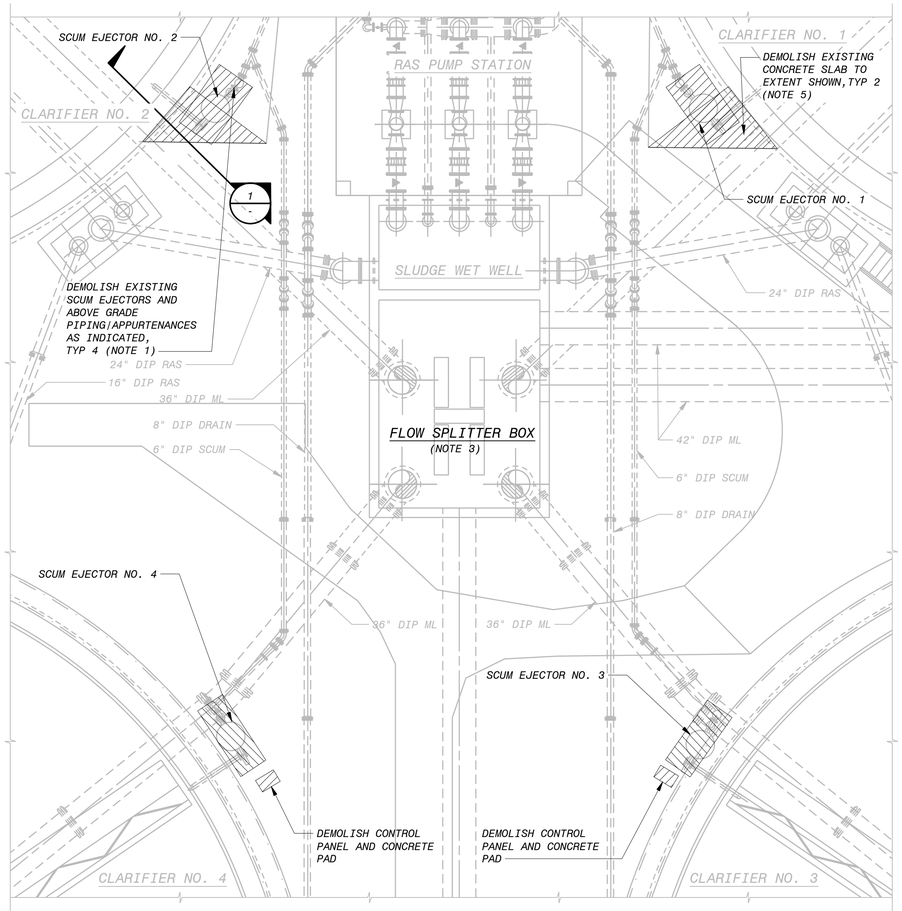
DESIGNED: RE
DETAILED: PR
CHECKED: MM
APPROVED: MT
DATE: NOVEMBER 2018

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

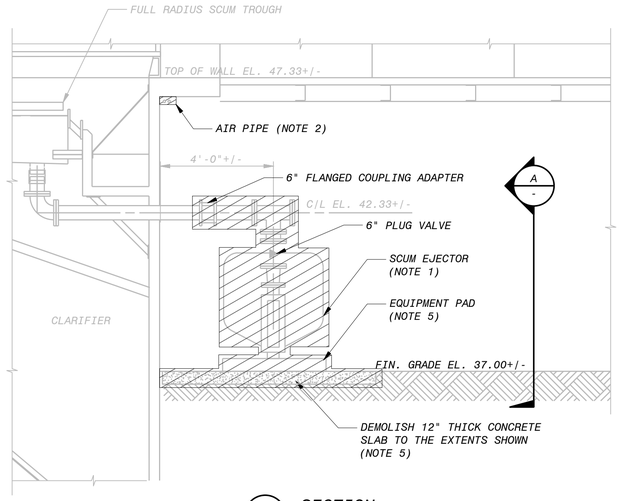
PROJECT NO.
198898

D-01
SHEET
OF

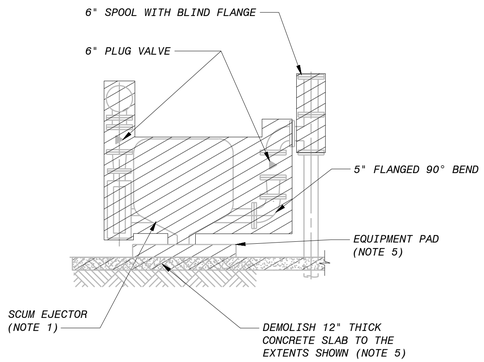
FD7000
198898



PLAN
1/8" = 1'-0"



1 - SECTION
3/8" = 1'-0"
SCUM EJECTOR 2 & 4
(SCUM EJECTORS 1 & 3 ARE SIMILAR BUT MIRRORED)



A - SECTION
3/8" = 1'-0"
SCUM EJECTOR 2 & 4
(SCUM EJECTORS 1 & 3 ARE SIMILAR BUT MIRRORED)

LEGEND:

DEMOLITION WORK

NOTES:

1. DEMOLISH EXISTING SCUM EJECTOR, CONTROL PANEL, EQUIPMENT PAD AND ASSOCIATED ABOVE GRADE PIPING/APPURTENANCES. WALL PIPE AND BURIED SPOOL SECTIONS TO REMAIN. CONTROL PANELS FOR SCUM PUMPS #1 AND #2 ARE LOCATED UNDER THE CANOPY.
2. DEMOLISH ALL ABOVE GRADE PIPING, VALVES AND APPURTENANCES ASSOCIATED WITH THE SCUM EJECTOR AIR SYSTEM. BURIED PIPING AND CONDUITS SHALL BE CUT FLUSH WITH FINISHED FLOOR OR GRADE ELEVATION, CAPPED AND ABANDONED IN PLACE. FOR PRICING PURPOSES, CONTRACTOR SHALL ASSUME THE NEED TO DEMOLISH 130 LINEAR FEET OF ABOVE GRADE 1" TYPE 'L' COPPER PIPE WITH CAST BRASS FITTINGS STEEL PIPE.
3. EXISTING LIGHTS AT FLOW SPLITTER BOX SHALL BE REPLACED WITH LED FIXTURES. REFER TO ELECTRICAL DRAWINGS FOR DETAILS.
4. CONTRACTOR SHALL CONDUCT UTILITE LOCATES IN THE VICINITY OF THE DEMO WORK AT EACH PNEUMATIC SCUM EJECTOR TO VERIFY EXISTING CONDITIONS BEFORE ORDERING MATERIALS/EQUIPMENT AND CONDUCTING DEMO ACTIVITIES.
5. PNEUMATIC SCUM EJECTOR'S 3 AND 4 DO NOT HAVE A CONCRETE SLAB, AND ONLY HAVE AN EQUIPMENT PAD (FLUSH WITH GRADE) THAT MUST BE DEMOLISHED.
6. REFER TO SPECIFICATION ON CONSTRUCTION CONSTRAINTS THAT MUST BE FOLLOWED TO AVOID ADVERSELY IMPACTING PLANT OPERATIONS DURING DEMO ACTIVITIES.

8' 4' 0 8' 16'
1/8"=1'-0"

12" 6" 0 1' 2' 3' 4' 5' 6' 7'
3/8"=1'-0"

NO.	BY	CK APP
D	AD	MM MT
C	AD	RE MT
B	AD	RE MT
A	AD	MM MT

DATE	REVISIONS AND RECORD OF ISSUE
FEB 2019	100% SUBMITTAL
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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

DEMOLITION
PNEUMATIC SCUM EJECTORS
PLAN AND SECTIONS

DESIGNED: RE
DETAILED: PR
CHECKED: MM
APPROVED: MT
DATE: NOVEMBER 2018

0 1/2 1
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PROJECT NO.
198898

D-02
SHEET
OF

FD7000
198898

STRUCTURAL NOTES

GENERAL

1. THE APPLICABLE BUILDING CODE IS THE 2017 FLORIDA BUILDING CODE.
2. THE REQUIREMENTS INDICATED ON THIS SHEET ARE INTENDED AS A BASIC SUMMARY OF THE MATERIAL AND CONSTRUCTION REQUIREMENTS FOR THE PROJECT. ADDITIONAL, MORE STRINGENT REQUIREMENTS ARE GIVEN IN THE PROJECT DETAIL DRAWINGS AND SPECIFICATIONS.
3. ALL STRUCTURAL RELATED SHOP DRAWINGS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION.
4. STRUCTURES MAY BE BUOYANT WHEN EMPTY DURING CONSTRUCTION. CONTRACTOR SHALL PROTECT STRUCTURES AGAINST FLOTATION UNTIL CONSTRUCTION IS COMPLETE.

CAST-IN-PLACE CONCRETE

1. A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c) OF 4,000 PSI WAS UTILIZED IN THE DESIGN OF STRUCTURAL REINFORCED CONCRETE. SEE SPECIFICATIONS FOR CONSTRUCTION STRENGTH REQUIREMENTS.
2. THE LOCATION OF ALL CONSTRUCTION JOINTS AND OTHER TYPES OF JOINTS, OTHER THAN THOSE SPECIFIED OR SHOWN ON THE PLANS, SHALL BE ACCEPTABLE TO THE ENGINEER PRIOR TO PLACING CONCRETE.

REINFORCING STEEL

1. ALL REINFORCING BAR SHALL BE GRADE 60, DEFORMED, ASTM A615, UNLESS NOTED OTHERWISE.
2. DIMENSIONS TO REINFORCING BARS ARE TO BAR CENTERLINES, UNLESS NOTED OTHERWISE. BAR COVER IS THE CLEAR DISTANCE BETWEEN THE BAR AND THE CONCRETE SURFACE.
3. NO WELDING OF REINFORCING BARS SHALL BE PERMITTED UNLESS APPROVAL IS OBTAINED FROM THE ENGINEER PRIOR TO CONSTRUCTION.

POST-INSTALLED ANCHORS

1. POST-INSTALLED ANCHORS SHALL INCLUDE ADHESIVE ANCHORS (THREADED RODS, BOLTS OR REINFORCING BARS), EXPANSION ANCHORS, AND UNDERCUT ANCHORS INSTALLED INTO HARDENED CONCRETE OR MASONRY. SEE THE ANCHORAGE IN CONCRETE AND MASONRY SPECIFICATION SECTION FOR ADDITIONAL REQUIREMENTS.
2. POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE INDICATED ON THE DRAWINGS. CONTRACTOR SHALL OBTAIN APPROVAL FROM ENGINEER PRIOR TO USING POST-INSTALLED ANCHORS FOR MISSING OR MISPLACED CAST-IN-PLACE ANCHORS.
3. CARE SHALL BE TAKEN TO AVOID CONFLICTS WITH EXISTING REINFORCING STEEL AND OTHER EMBEDDED ITEMS WHEN DRILLING HOLES. REINFORCING BARS SHALL NOT BE DAMAGED DURING DRILLING OR ANCHOR INSTALLATION. HOLES SHALL BE DRILLED AND CLEANED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS. ANCHORS SHALL BE INSTALLED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS AT NOT LESS THAN MINIMUM EDGE DISTANCES AND/OR SPACINGS INDICATED IN THE MANUFACTURER'S LITERATURE.
4. SUBSTITUTION REQUESTS FOR PRODUCTS OTHER THAN THOSE LISTED IN THE SPECIFICATION OR INDICATED ON THE DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW AND APPROVAL. PRODUCT ICC-ESR EVALUATION REPORTS SHALL BE INCLUDED WITH THE SUBMITTAL PACKAGE. IF REQUESTED, CALCULATIONS PREPARED BY A REGISTERED PROFESSIONAL ENGINEER USING METHODS AND PROCEDURES REQUIRED BY THE BUILDING CODE MAY BE REQUIRED AS PART OF THE SUBMITTAL PACKAGE.
5. UNLESS NOTED OTHERWISE, THE MINIMUM EMBEDMENT PROVIDED FOR ADHESIVE ANCHORED REINFORCING BARS SHALL DEVELOP THE FULL TENSILE STRENGTH OF THE BAR.
6. SPECIAL INSPECTION WILL BE PROVIDED FOR ALL POST-INSTALLED ANCHORS.

STAINLESS STEEL

1. STAINLESS STEEL BOLTS SHALL CONFORM TO ASTM F593, ALLOY GROUP 1 OR 2, UNLESS NOTED OTHERWISE. MINIMUM YIELD STRENGTH SHALL BE 45 KSI.

SOIL AND FOUNDATIONS

1. FOUNDATION CONSTRUCTION SHALL NOT BEGIN UNTIL ANY REQUIRED SPECIAL INSPECTION HAS BEEN COMPLETED AND THE CONTRACTOR NOTIFIED TO PROCEED.
2. TO FACILITATE SCHEDULING, AT LEAST 48 HOURS ADVANCE NOTICE SHALL BE GIVEN TO THE ENGINEER PRIOR TO THE REQUIRED INSPECTIONS.
3. UNLESS NOTED OTHERWISE, BACKFILL SHALL NOT BE PLACED AGAINST WALLS WHICH SUPPORT A CONCRETE SLAB OR WALKWAY UNTIL THE TOP SLAB OR WALKWAY HAS BEEN PLACED IN ITS ENTIRETY AND ALL CONCRETE HAS REACHED THE SPECIFIED DESIGN STRENGTH.
4. THE FOLLOWING NET ALLOWABLE BEARING PRESSURES WERE UTILIZED IN THE DESIGN OF THE FOUNDATIONS. ASSUMED VALE BASED ON 2015 IBC CHAPTER 18 PRESUMPTIVE ALLOWABLE BEARING PRESSURES.

   SPREAD FOOTINGS ..... 1500 PSF

EXISTING STRUCTURES

1. THE DRAWINGS DEPICT WORK AT EXISTING STRUCTURES. ALL DIMENSIONS AND ALL DEPICTIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS, STARTING FABRICATION, OR STARTING CONSTRUCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, REPAIRS OR STRUCTURAL MODIFICATIONS THAT ARE REQUIRED DUE TO DEMOLITION BEYOND THE LIMITS IDENTIFIED ON THE DRAWINGS.
3. REINFORCEMENT FOR ANY EXISTING CONCRETE OR MASONRY ELEMENT SHALL NOT BE DAMAGED UNLESS THE ELEMENT IS TO BE DEMOLISHED. WHEN LOCATING EXISTING REINFORCEMENT IS REQUIRED, IT SHALL BE LOCATED USING NON-DESTRUCTIVE METHODS. REINFORCING STRANDS IN EXISTING PRESTRESSED CONCRETE SHALL NOT BE CUT, UNLESS INDICATED ON THE DRAWINGS OR OTHERWISE AUTHORIZED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, REPAIRS OR STRUCTURAL MODIFICATIONS THAT ARE REQUIRED DUE TO DAMAGE OF CONCRETE, MASONRY OR REINFORCEMENT THAT HAS BEEN IDENTIFIED ON THE DRAWINGS TO REQUIRE FIELD VERIFICATION.
4. CORE DRILLING AND SAW CUTTING SHALL NOT BE PERFORMED UNLESS INDICATED ON THE DRAWINGS OR APPROVED BY ENGINEER.
5. EXPOSED CONCRETE SURFACES THAT REMAIN AFTER DEMOLITION SHALL BE REPAIRED TO MATCH ADJACENT CONCRETE SURFACES.
6. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, EXPOSED CONCRETE SURFACES WITH REINFORCEMENT, ANCHOR BOLTS, HANGER RODS, OR OTHER EXPOSED METAL EMBEDMENTS SHALL BE REPAIRED BY CUTTING OFF THE METAL AT THE FACE OF THE CONCRETE, GRINDING SMOOTH, AND COATING. COATING SHALL EXTEND A MINIMUM OF 1" BEYOND THE EDGE OF ANY EXPOSED METAL.

LOADING CRITERIA

1. DEAD LOAD ..... CALCULATED
2. LIVE LOAD:
   OPERATING AND PROCESS FLOORS..... 150 PSF
3. WIND LOAD:
   ULTIMATE DESIGN WIND SPEED..... 146 MPH
   NOMINAL DESIGN WIND SPEED..... 113 MPH
   EXPOSURE..... C
4. SEISMIC LOAD:
   MAPPED MCE SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (S_S)..... 0.056g
   MAPPED MCE ONE SECOND PERIOD SPECTRAL RESPONSE ACCELERATION (S_1)..... 0.029g
   DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (S_{DS})..... 0.059g
   DESIGN SPECTRAL RESPONSE ACCELERATION AT ONE SECOND PERIOD (S_{D1})..... 0.046g
   SITE CLASS..... D
5. SNOW LOAD:
   GROUND SNOW LOAD (P_g)..... 0 PSF
   FLAT-ROOF SNOW LOAD (P_f)..... 0 PSF
   SNOW EXPOSURE FACTOR (C_e)..... 0.9
   IMPORTANCE FACTOR (I_S)..... 1.1
   THERMAL FACTOR (C_t)..... 1.0
6. 100 YEAR FLOOD ELEVATION..... N/A

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE
C	AD	RE	MT	FEB 2019	100% SUBMITTAL
B	RZ	MM	MT	NOV 2018	90% SUBMITTAL
A	RZ	MM	MT	SEPT 2018	60% SUBMITTAL

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SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

STRUCTURAL NOTES

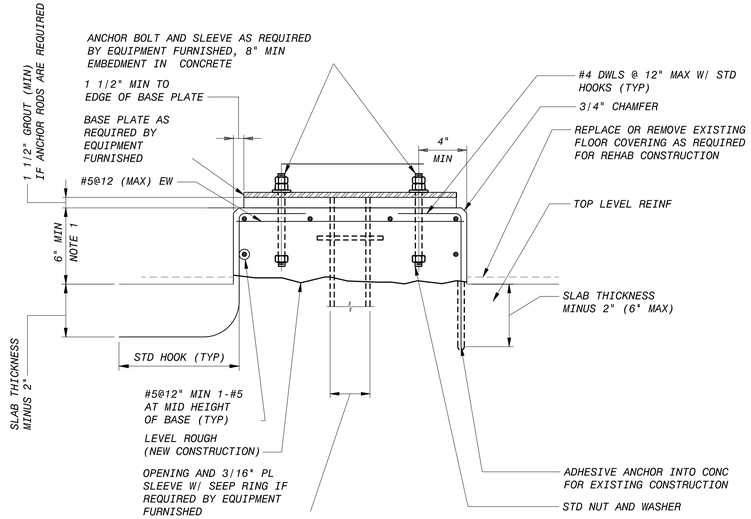
DESIGNED: JM/RZ
DETAILED: AS
CHECKED: DD
APPROVED: RR
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

S-01
SHEET
07 OF 35

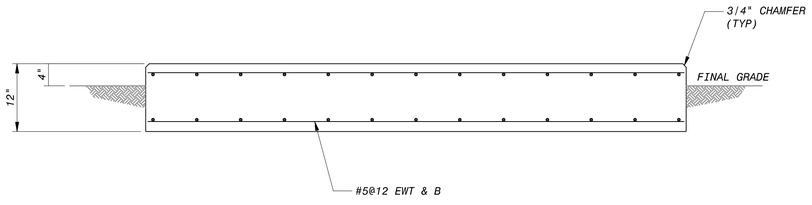
FD7000
198898



A EQUIPMENT BASE
NO SCALE

NOTE:

1. PAD DIMENSION DETERMINED BY EQUIPMENT FURNISHED.



B EXTERIOR EQUIPMENT PAD
M-03 NO SCALE

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B	RZ	NM	MT
C	AD	RE	MT

REVISIONS AND RECORD OF ISSUE

DATE	
SEPT 2018	60% SUBMITTAL
NOV 2018	90% SUBMITTAL
FEB 2019	100% SUBMITTAL

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STRUCTURAL DETAILS

DESIGNED: JM/RZ
DETAILED: AS
CHECKED: DD
APPROVED: RR
DATE: FEB 2019

0 1/2 1
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PROJECT NO.
198898

S-02
SHEET
08 OF 35

FD7000
198898

SCUM PUMP NO.2
(NOTE 1)

CLARIFIER NO. 2

24" DIP RAS

DRAIN FROM
CLARIFIER 4
TO WAS PUMPS

EXISTING 8" DRAIN

SLUDGE FROM
CLARIFIERS 2 AND 4

TO CLARIFIER 4
(36" ML)

TO CLARIFIER 2
(36" ML)

RAS PUMP NO. 3

10" DISMANTLING
JOINT (TYP 3)

CONNECT TO EXISTING ABOVE
GRADE FLANGED PW PIPING

18" PLUG VALVE
(TYP 3)

6" PLUG VALVE

16"x6" TEE

EXISTING FLOOR
DRAIN (TYP)

WAS PUMP NO. 4

4" DISMANTLING
JOINT(TYP 4)

6"x4" REDUCER
(TYP 4)

SCUM FROM
CLARIFIERS 2 AND 4

8" PLUG VALVE
ON VERTICAL

EXISTING FLOOR
DRAIN (TYP 4)

8" CROSS
(TYP 2)

WAS PUMP NO. 2

PLANT WATER
FOR FLUSHING

DRAIN FROM
CLARIFIER 2
TO WAS PUMPS

SEAL WATER PIPING
(TYP)(SEE NOTE 9)

8" PLUG VALVE
(TYP 4)

6" MAGNETIC
FLOWMETER

6" DISMANTLING
JOINT

AIR RELIEF VALVE (TYP)
(SEE NOTE 6)

B
M-04

TO GRAVITY BELT
THICKENERS

DRAIN FROM
CLARIFIER 1
TO WAS PUMPS

MODULAR WALL SEALS AT
INTERIOR AND EXTERIOR SIDES
OF ALL RAS INFLUENT /
EFFLUENT PENETRATIONS AND
SEALS AT INTERIOR OF BOTH
WAS PENETRATIONS (TYP)
(SEE NOTE 5)

RAS PUMP NO. 2

SLUDGE WET WELL

6" PLUG VALVE
(TYP 5)

2
M-02

FLOW SPLITTER BOX
(NOTES 2, 3)

1
M-02

4" PLUG VALVE
ON VERTICAL

3'-6" (MIN)

2'-0" (MIN)

EXISTING 8" WAS

8" PLUG VALVE
ON VERTICAL

8" DISMANTLING
JOINT (TYP 8)

8"x6" ECCENTRIC
REDUCER (TYP 4)

20"x18" REDUCING
90 ELBOW (TYP 2)

RAS PUMP NO. 1

8"x6"CROSS
(TYP 2)

6" CHECK
VALVE (TYP 4)

9'-0"
(MIN)

4'-6"
(MIN)

PRESSURE GAUGE

18" MAGNETIC FLOWMETER

18" DISMANTLING JOINT

CONNECT ELBOW TO EXISTING
ABOVE GRADE FLANGED RAS
PIPING (TYP 2)

SEE NOTE 10

REUSE EXISTING
SUPPORT, TYP OF 3

B
M-04
AIR RELIEF
VALVE

TO CLARIFIER 2
(36" ML)

MIXED LIQUOR TO
FLOW SPLITTER BOX

TO CLARIFIER 3
(36" ML)

CONNECT TO
EXISTING WALL
SLEEVE (TYP)

10" DISMANTLING
JOINT (TYP 3)

16" CHECK VALVE
(TYP 3)

16" PLUG VALVE
(TYP 3)

MONORAIL HOIST SYSTEM

EXISTING 8" DRAIN

B
M-04
AIR RELIEF VALVE (TYP)
(SEE NOTE 6)

PRESSURE GAUGE (TYP)
(SEE NOTE 8)

8" PLUG VALVE
ON VERTICAL

WAS PUMP NO. 3

WAS PUMP NO. 1

SCUM FROM
CLARIFIERS 1 AND 3

RAS/WAS PUMP
STATION CANOPY
(SEE NOTE 4)

DRAIN FROM
CLARIFIER 3
TO WAS PUMPS

SLUDGE FROM
CLARIFIERS
1 AND 3

24" DIP RAS

SCUM PUMP NO.1
(NOTE 1)

CLARIFIER NO. 1

PLAN
1/4" = 1'-0"

NOTES:

1. REFER TO DRAWING M-03 FOR LAYOUT OF SCUM PUMPS.
2. MANUAL ACTUATORS ON THE FIVE EXISTING SPLITTER BOX GATES SHALL BE REPLACED WITH ELECTRICAL ACTUATORS. REFER TO INSTRUMENTATION DRAWINGS AND ELECTRICAL POWER PLANS FOR REQUIREMENTS.
3. EXISTING LIGHTS AT FLOW SPLITTER BOX SHALL BE REPLACED WITH LED FIXTURES. REFER TO ELECTRICAL DRAWINGS FOR DETAILS.
4. EXISTING LIGHTS AT RAS/WAS PUMP STATION CANOPY SHALL BE REPLACED WITH LED FIXTURES.REFER TO ELECTRICAL DRAWINGS FOR DETAILS.
5. CONTRACTOR TO INSTALL MODULAR WALL PENETRATION SEALS AT BOTH 24" RAS INFLUENT LOCATIONS, AND AT THE THREE 18" RAS OUTLET LOCATIONS, AS SHOWN. BOTH INTERIOR AND EXTERIOR SEALS SHALL BE INSTALLED AT EACH LOCATION. CONTRACTOR TO INSTALL SEALS AT BOTH WAS OUTLET LOCATIONS (INTERIOR SEALS ONLY). CONTRACTOR SHALL COORDINATE TO HAVE THIS WORK COMPLETED WHILE SLUDGE WET WELL IS DRAINED FOR OTHER WORK SEQUENCES IN THIS CONTRACT.
6. ROUTE AIR RELIEF VALVE DRAIN PIPING TO EXISTING FLOOR DRAINS AND SUPPORT ALONG PIPING AS TO NOT CAUSE A TRIPPING HAZARD.
7. REFER TO SPECIFICATIONS FOR CONSTRUCTION CONSTRAINTS AND STARTUP / TESTING SEQUENCING REQUIREMENTS THAT MUST BE FOLLOWED TO AVOID ADVERSELY IMPACTING PLANT OPERATIONS.
8. PRESSURE GAUGE ASSEMBLY TO INCLUDE BALL VALVE AND DRAIN PIPING FOR MANUAL AIR RELIEF. DRAIN PIPING TO BE ROUTED TO ADJACENT EXISTING FLOOR DRAIN.
9. CONNECT EXISTING SEAL WATER SYSTEM TO NEW PUMPS AND ROUTE PIPING AS TO NOT CAUSE A TRIPPING HAZARD.
10. LOCATION OF FLOW METER PANEL SHALL BE COORDINATED WITH ENGINEER.
11. CONTRACTOR SHALL SUBMIT AN APPROVED PIPE LAYOUT SUBMITTAL BEFORE ORDERING EQUIPMENT AND MATERIALS. IN ORDER TO MEET THE SHUTDOWN DURATIONS DEFINED IN THE SPECIFICATIONS, CONTRACTOR MAY NEED TO PERFORM ACTIVITIES SUCH AS PRE FIT PIPING AND APPURTENANCES TO ENSURE WORK IS ACCOMPLISHED WITHIN THE TIME ALLOCATED BY THE CONTRACT.

4' 2' 0 4' 8'
1/4"=1'-0"

NO.	BY	CK APP
A	AD	RE MT
B	AD	RE MT
C	AD	RE MT
D	AD	RE MT

REVISIONS AND RECORD OF ISSUE

DATE	
JULY 2018	30% SUBMITTAL
SEPT 2018	60% SUBMITTAL
NOV 2018	90% SUBMITTAL
FEB 2019	100% SUBMITTAL

50.3090 - Mechanical Drawings
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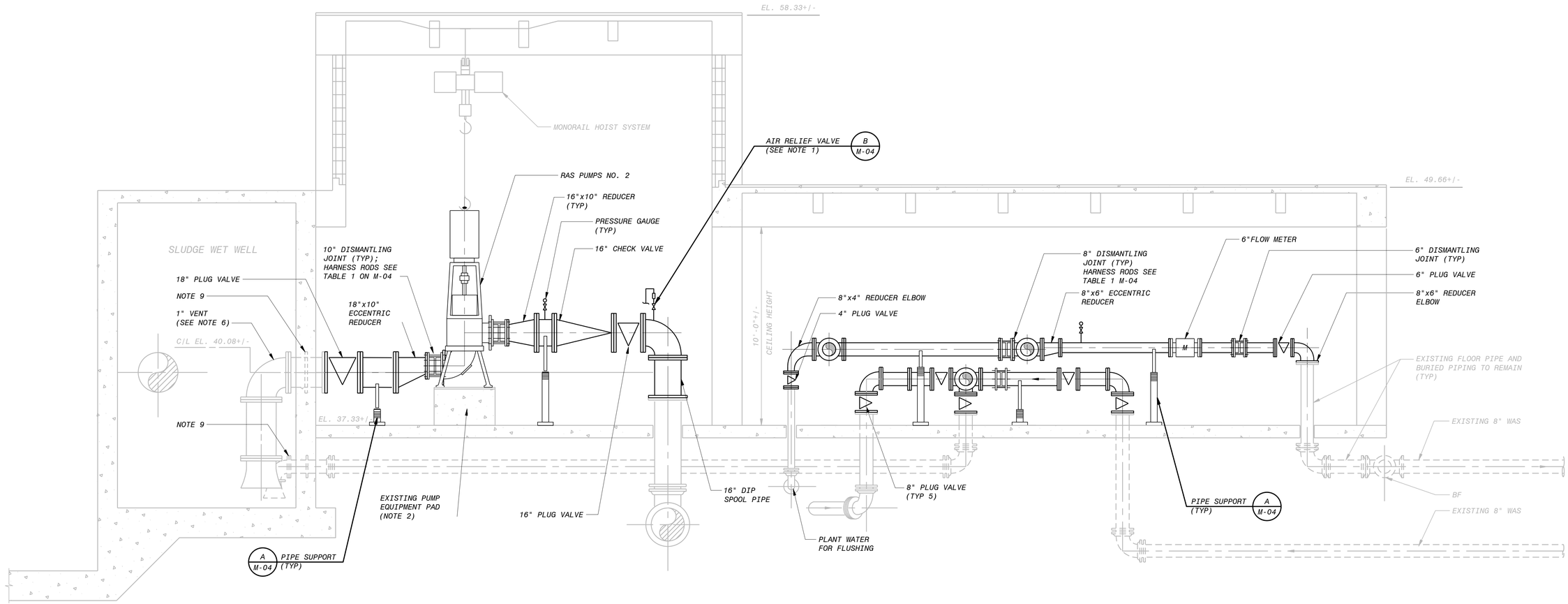
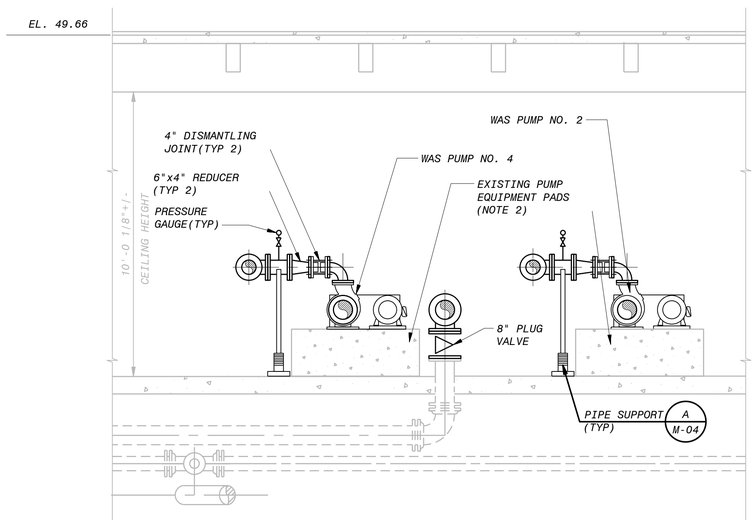
M-01
SHEET
09 OF 35

FD7000
198898



1 M-01 SECTION 3/8" = 1'-0"



2 M-01 SECTION 3/8" = 1'-0"

NOTES:

1. ROUTE AIR RELIEF VALVE DRAIN PIPING TO EXISTING FLOOR DRAINS AS SHOWN AND SUPPORT ALONG PIPING AS TO NOT CAUSE A TRIPPING HAZARD.
2. CLEAN AND PREPARE EXISTING CONCRETE PUMP BASES SIDES AND TOP FOR EPOXY COATING. SEE SPECIFICATION SECTION 09940 FOR EPOXY COATING REQUIREMENT FOR CONCRETE. TYPICAL ALL EXISTING CONCRETE PUMP PADS.
3. PIPE SUPPORTS SHALL BE REPLACED IN THE SAME LOCATIONS AS EXISTING PIPE SUPPORTS.
4. CONTRACTOR SHALL SUBMIT AN APPROVED PIPE LAYOUT SUBMITTAL BEFORE ORDERING EQUIPMENT / MATERIALS. IN ORDER TO MEET THE SHUTDOWN DURATIONS DEFINED IN THE SPECIFICATIONS, CONTRACTOR MAY NEED TO PERFORM ACTIVITIES SUCH AS PRE FIT PIPING AND APPURTENANCES TO ENSURE WORK IS ACCOMPLISHED WITHIN THE TIME ALLOCATED BY THE CONTRACT.
5. WITH ADVANCE COORDINATION WITH THE COUNTY, CONTRACTOR MAY USE EXISTING HOIST SYSTEM FOR INSTALLING RAS PUMPS. CONTRACTOR TAKES ALL RESPONSIBILITY FOR ENSURING THE HOIST IS SUITABLE FOR WORK AND IS IN GOOD WORKING ORDER.
6. CONTRACTOR TO DRILL 1" VENT HOLES IN TOP OF EXISTING 18" 90° BEND AS SHOWN FOR EACH RAS PUMP SUCTION ASSEMBLY. CONTRACTOR SHALL COORDINATE TO HAVE THIS WORK COMPLETED WHILE WET WELL IS DRAINED FOR OTHER WORK SEQUENCES IN THIS CONTRACT.
7. PRESSURE GAUGE ASSEMBLY TO INCLUDE BALL VALVE AND DRAIN PIPING FOR MANUAL AIR RELIEF. DRAIN PIPING TO BE ROUTED TO ADJACENT EXISTING FLOOR DRAIN.
8. CONNECT EXISTING SEAL WATER SYSTEM TO NEW PUMPS AND ROUTE PIPING AS TO NOT CAUSE A TRIPPING HAZARD.
9. CONTRACTOR TO REMOVE MODULAR WALL PENETRATION SEALS AT THE THREE 18" RAS OUTLET LOCATIONS. CONTRACTOR TO REMOVE MODULAR WALL PENETRATION SEALS AT BOTH 8" WAS OUTLET LOCATIONS (INTERIOR SEALS ONLY). CONTRACTOR SHALL COORDINATE TO HAVE THIS WORK COMPLETED, ALONG WITH REPLACING NEW MODULAR WALL SEALS, WHILE SLUDGE WET WELL IS DRAINED FOR WORK SEQUENCE ASSOCIATED WITH THE REPLACEMENT OF RAS/WAS PUMPS AND PIPING.

12" 6" 0 1' 2' 3' 4' 5' 6' 7'
3/8"=1'-0"

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE
D	AD	RE	MT	FEB 2019	100% SUBMITTAL
C	AD	RE	MT	NOV 2018	90% SUBMITTAL
B	AD	RE	MT	SEPT 2018	60% SUBMITTAL
A	AD	RE	MT	JULY 2018	30% SUBMITTAL

50.3090 - Mechanical Drawings
M-02.dwg
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XREF2:
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USER:RANK4017
DWG VER:1011
XREF4:

WEN-TACHE MICHAEL LICENSE No 83893 STATE OF FLORIDA PROFESSIONAL ENGINEER

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Tampa, Florida
Certificate No. 8132

MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

MECHANICAL
RAS/WAS PUMP STATION
SECTIONS

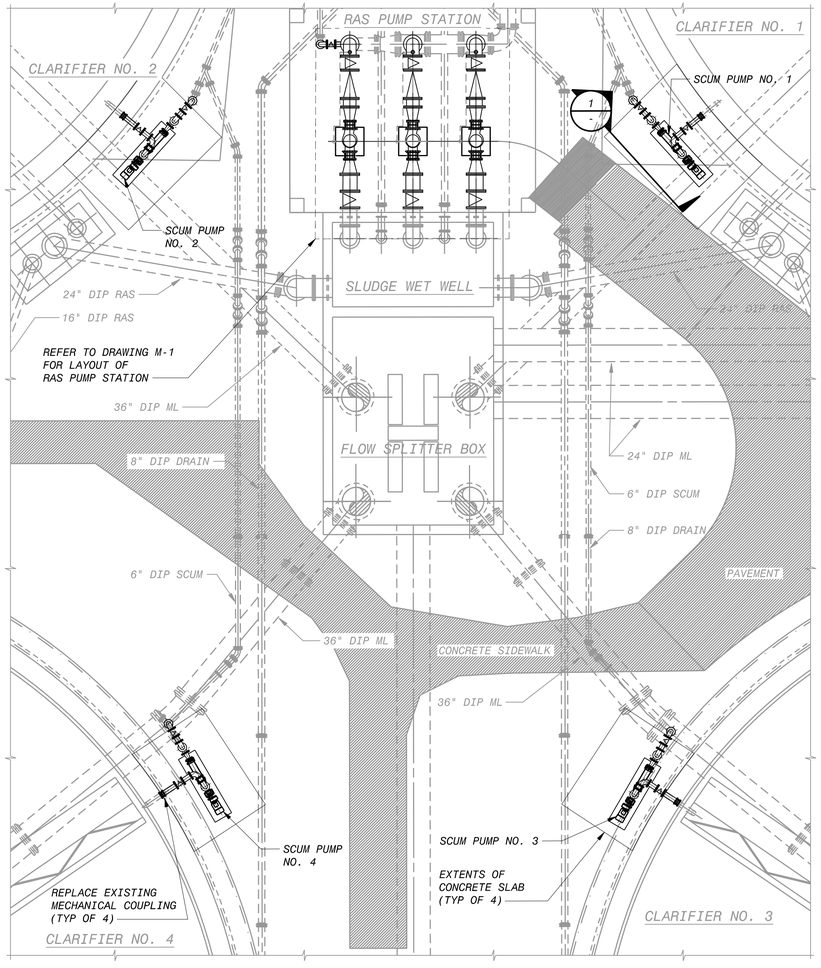
DESIGNED: RE
DETAILED: PR
CHECKED: BV
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

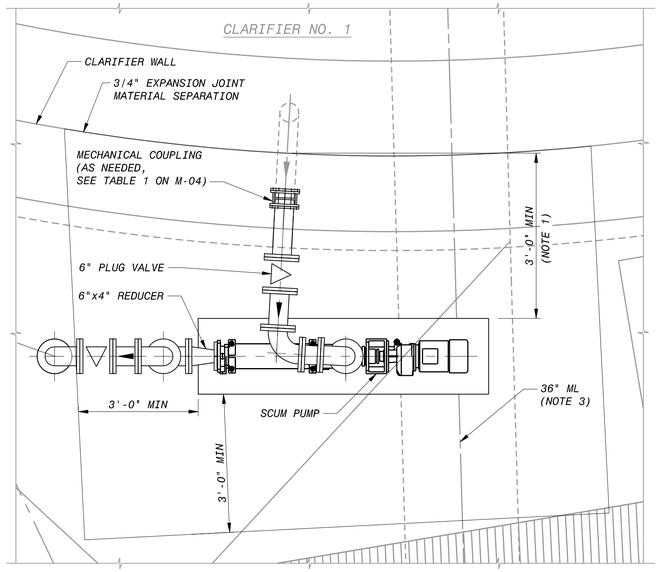
PROJECT NO.
198898

M-02
SHEET
10 OF 35

FD7000
198898



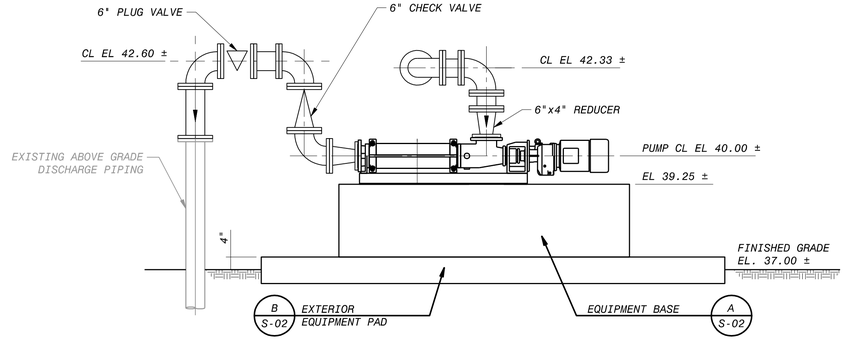
ENLARGED PLAN
1/8" = 1'-0"



SCUM PUMP 1 & 3

PLAN
1/2" = 1'-0"

(SCUM PUMPS 2 & 4 ARE SIMILAR BUT MIRRORED)



1 - SECTION
1/2" = 1'-0"

(SCUM PUMPS 2 & 4 ARE SIMILAR BUT MIRRORED)

NOTES:

1. CONTRACTOR SHALL ADJUST DIMENSION AS NEEDED TO FACILITATE ALIGNMENT OF NEW SCUM PUMPS WITH EXISTING DISCHARGE PIPING. CONTRACTOR SHALL LAYOUT SCUM PUMPS AND PIPE ROUTING BASED ON AS-BUILT CONDITIONS AND SUBMIT TO ENGINEER FOR REVIEW.
2. 36" ML IS AT AN APPROXIMATE CENTERLINE ELEVATION OF 25.83' AT THE CROSSING WITH SCUM PUMPS NO. 3 AND NO. 4.
3. 36" ML IS AT AN APPROXIMATE CENTERLINE ELEVATION OF 28.33' AT THE CROSSING WITH SCUM PUMPS NO. 1 AND NO. 2.
4. CONCRETE SLAB TO EXTEND A MINIMUM OF 3 FEET FROM EDGE OF NEW PUMP BASE ON ALL SIDES. SLAB IS TO EXTEND TO THE EXTERIOR CLARIFIER WALL.
5. REFER TO SPECIFICATIONS FOR CONSTRUCTION CONSTRAINTS AND STARTUP / TESTING SEQUENCING REQUIREMENTS THAT MUST BE FOLLOWED TO AVOID ADVERSELY IMPACTING PLANT OPERATIONS.
6. CONTRACTOR SHALL FIELD CONFIRM EXISTING TIE-IN LOCATIONS BEFORE ORDERING MATERIALS/EQUIPMENT.
7. CONTRACTOR SHALL SUBMIT AN APPROVED PIPE LAYOUT SUBMITTAL BEFORE ORDERING EQUIPMENT AND MATERIALS. IN ORDER TO MEET THE SHUTDOWN DURACTION DEFINED IN THE SPECIFICATIONS, CONTRACTOR MAY NEED TO PERFORM ACTIVITIES SUCH AS PRE FIT PIPING AND APPURTENANCES TO ENSURE WORK IS ACCOMPLISHED IN ACCORDANCE WITH CONTRACT REQUIREMENTS.

12" 6" 0 1' 2' 3' 4' 5'
1/2"=1'-0"

8' 4' 0 8' 16'
1/8"=1'-0"

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE
D	AD	RE	MT	FEB 2019	100% SUBMITTAL
C	AD	MM	MT	NOV 2018	90% SUBMITTAL
B	AD	MM	MT	SEPT 2018	60% SUBMITTAL
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50.3090 - Mechanical Drawings
M-03.dwg

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PLOTTED:
USER: RAMB4017
DWG VER: 1010

XREF1:
XREF2:
XREF3:
XREF4:

MICHAEL N. TACHE ★ LICENSE ★ No. 83893 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

MECHANICAL
SCUM PUMPS
PLAN AND SECTIONS

DESIGNED: RE
DETAILED: PR
CHECKED: BV
APPROVED: MT
DATE: FEB 2019

0 1/2 1
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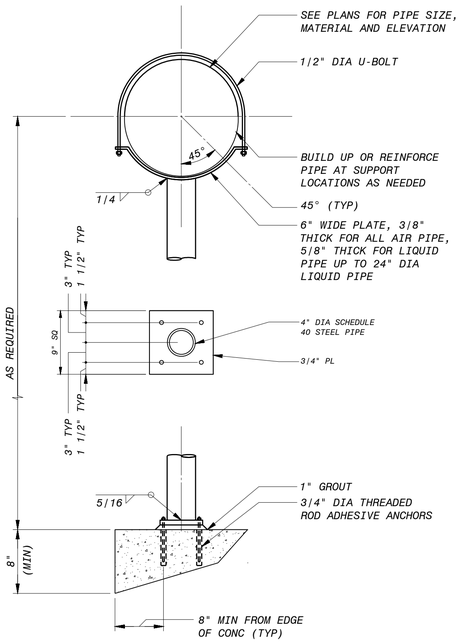
PROJECT NO.
198898

M-03
SHEET
11 OF 35

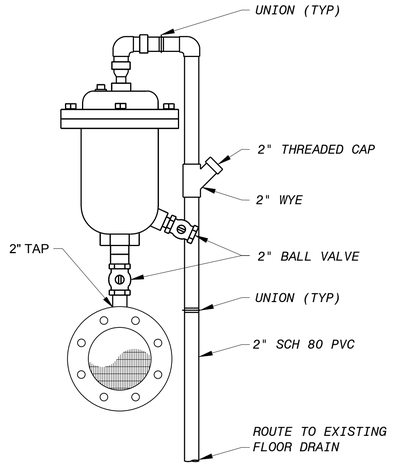
FD7000
198898



A M-01 4" DIAMETER STEEL COLUMN PIPE SUPPORT
NO SCALE

NOTE:

1. ALL STEEL MATERIALS SHALL BE HOT-DIP GALVANIZED FOR EXTERIOR LOCATIONS. VENT HOLES FOR GALVANIZING SHALL BE THE MINIMUM SIZE NECESSARY. HOLES SHALL BE LOCATED IN THE BOTTOM BASEPLATE AND ALSO LOCATED IN THE TOP OF THE PIPE, ADJACENT TO THE CURVED PLATE.



B M-01 AIR RELIEF VALVE
NO SCALE

TABLE 1 - HARNESS RODS

PIPE SIZE	NO. OF HARNESS RODS	DIA OF HARNESS RODS
4"	4	3/4"
6"	4	7/8"
8"	4	7/8"
12"	4	7/8"

NO.	BY	CK	APP
D	AD	RE	MT
B	AD	RE	MT
A	AD	RE	MT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50.3090 - Mechanical Drawings
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MECHANICAL DETAILS

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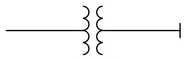
198898

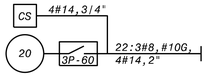
M-04
SHEET
12 OF 35

FD7000
198898

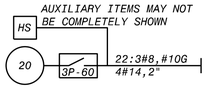
ONE-LINE DIAGRAM LEGEND



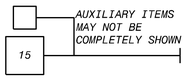
TRANSFORMER WITH PRIMARY AND SECONDARY VOLTAGE, AND KVA RATING AS NOTED



CIRCUIT NO.22 WITH #8 INSTALLED CONDUCTORS AND 1#10 GROUND WIRE FOR A 20HP MOTOR WITH 3 POLE, 60A, MOTOR DISCONNECT SWITCH AND 4#14 INSULATED CONDUCTORS FOR AUXILIARY ITEM, AS FOR EXAMPLE A CONTROL STATION, ALL IN 2" CONDUIT.



CONDUCTORS FOR AUXILIARY ITEM SHALL NOT PASS THROUGH MOTOR DISCONNECT SWITCH.

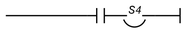


ONE-LINE SHOWING POWER AND CONTROL TO A PACKAGE UNIT, AS FOR EXAMPLE A STEAM GENERATOR OR AN AIR HANDLING UNIT, SHALL IMPLY THAT ANY AND ALL ASSOCIATED EQUIPMENT SHALL ALSO BE INSTALLED AND WIRED AS REQUIRED BY THE EQUIPMENT FURNISHED.

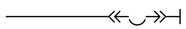

INDICATES THAT ALL OR PART OF CIRCUIT MAY BE ROUTED IN DUCT BANK OR UNDERGROUND. CONDUIT SIZE SHOWN ON ONE-LINE IS ABOVE GROUND AND/OR INSIDE OF STRUCTURE. SEE DUCT BANK SCHEDULE AND SECTIONS FOR CONDUIT SIZE OF UNDERGROUND PORTION OF CIRCUIT.


HIGH VOLTAGE DRAWOUT AIR OR VACUUM CIRCUIT BREAKER

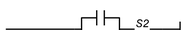
LOW VOLTAGE AIR CIRCUIT BREAKER, 3 POLE, 20 AMPERE



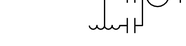
SIZE 4 COMBINATION MAGNETIC MOTOR STARTER


LOW VOLTAGE DRAWOUT AIR CIRCUIT BREAKER


HIGH VOLTAGE DRAWOUT CONTACTOR


FUSE AND DISCONNECT SWITCH

SIZE 2 COMBINATION MAGNETIC MOTOR STARTER, REVERSING OR 2 SPEED



SIZE 1 COMBINATION REDUCED VOLTAGE AUTOTRANSFORMER


POTENTIAL TRANSFORMER

CURRENT TRANSFORMER


CURRENT OR POTENTIAL TEST SWITCH

GENERATOR

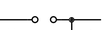
KIRK KEY INTERLOCK

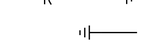
ELECTRICAL INTERLOCK

RESISTOR

PROTECTION RELAY WITH IEEE DEVICE FUNCTION AS SHOWN

SINGLE-FUNCTION METER


SURGE OR LIGHTNING ARRESTER


SURGE ARRESTER WITH SURGE CAPACITOR

GROUND CONNECTION

CABLE BUS

SCHEMATIC SYMBOLS

- WIRE CONNECTION POINT
- EXTERNAL CONNECTION POINT
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- STARTER, CONTACTOR OR RELAY COIL
- NORMALLY OPEN PUSH BUTTON
- NORMALLY CLOSED PUSH BUTTON
- MAINTAINED PUSH BUTTON
- NORMALLY CLOSED GEARED LIMIT SWITCH
- NORMALLY OPEN GEARED LIMIT SWITCH
- INDICATING LIGHT
- INDICATING LIGHT WITH PUSH-TO-TEST
- FUSE
- POTENTIOMETER
- CAPACITOR
- DIODE
- RESISTOR
- CONTROL POWER TRANSFORMER
- SWITCH
- MS — MANUAL STARTER
- OL — OVERLOAD
- OVERLOAD
- ELECTRODE
- FLOAT SWITCH (CLOSING ON RISING LEVEL)
- FLOAT SWITCH (OPENING ON RISING LEVEL)
- P — PRESSURE SWITCH (CLOSING ON RISING PRESSURE)
- P — PRESSURE SWITCH (OPENING ON RISING PRESSURE)
- V — VACUUM SWITCH (CLOSING ON INCREASING VACUUM)
- V — VACUUM SWITCH (OPENING ON INCREASING VACUUM)
- TEMPERATURE SWITCH (CLOSING ON RISING TEMPERATURE)
- TEMPERATURE SWITCH (OPENING ON RISING TEMPERATURE)
- FLOW ACTUATED SWITCH (CLOSING ON INCREASE IN FLOW)
- FLOW ACTUATED SWITCH (OPENING ON INCREASE IN FLOW)
- ON TIME DELAY CONTACT (NORMALLY OPEN, WHEN THE COIL IS ENERGIZED THE CONTACT WILL CLOSE AFTER A TIME DELAY)
- ON TIME DELAY CONTACT (NORMALLY CLOSED, WHEN THE COIL IS ENERGIZED THE CONTACT WILL OPEN AFTER A TIME DELAY)
- OFF TIME DELAY CONTACT (NORMALLY OPEN, WHEN THE COIL IS DE-ENERGIZED THE CONTACT WILL OPEN AFTER A TIME DELAY)
- OFF TIME DELAY CONTACT (NORMALLY CLOSED, WHEN THE COIL IS DE-ENERGIZED THE CONTACT WILL CLOSE AFTER A TIME DELAY)
- TORQUE SWITCH (NORMALLY OPEN)
- TORQUE SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY OPEN)
- LIMIT SWITCH (NORMALLY OPEN, HELD CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED, HELD OPEN)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY OPEN, CLOSING ON INCREASING DIFF.)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY CLOSED, OPENING ON INCREASING DIFF.)

SWITCH & OUTLET SYMBOLS

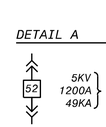
- S — SINGLE POLE SWITCH
- S_2 — TWO POLE SWITCH
- S_{3A} — THREE-WAY SWITCH CONTROLLING LIGHTS WITH "A" DESIGNATION
- S_4 — FOUR-WAY SWITCH
- S_M^{C1} — MOMENTARY SWITCH CONTROLLING CONTACTOR C1
- DUPLEX RECEPTACLE 120 VOLT
- SIMPLEX RECEPTACLE
- RANGE RECEPTACLE
- TWISTLOCK RECEPTACLE
- 30 — 240V, 10 RECEPTACLE, TYPICAL AMPERE RATING NOTED
- 60 — 480V, 30 WELDING RECEPTACLE, TYPICAL AMPERE RATING NOTED
- 120 VOLT DUPLEX RECEPTACLE (UPS)
- DUPLEX FLOOR OUTLET
- TELEPHONE OUTLET
- TELEPHONE FLOOR OUTLET
- CX — COAXIAL CABLE OUTLET
- DATA NETWORK OUTLET
- CAM TYPE RECEPTACLES
- CABLES WITH CAM TYPE PLUGS

MISCELLANEOUS SYMBOLS

- STROBE
- HORN & STROBE
- HORN
- T — THERMOSTAT
- J — JUNCTION BOX
- GROUND ROD
- GROUND ROD WITH TEST WELL
- GROUND CONNECTION
- DISCONNECT SWITCH
- COMBINATION STARTER
- POWER PANEL
- LIGHTING PANEL
- MISCELLANEOUS PANEL
- LIGHTING CONTACTOR
- CAMERA
- GLASS BREAK DETECTOR

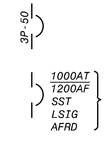
BREAKER DETAILS

DETAIL A



A 5KV CLASS MEDIUM-VOLTAGE, DRAWOUT, VACUUM OR AIR INSULATED CIRCUIT BREAKER WITH A 1,200 AMPERE FRAME. BREAKER HAS A 49,000 AMPERE MAXIMUM FAULT CURRENT INTERRUPTING RATING.

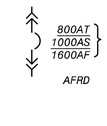
DETAIL B



A LOW VOLTAGE FIXED MOUNTED MOLDED CASE CIRCUIT BREAKER WITH A 50 AMPERE TRIP RATING.TRIP UNIT IS NON-ADJUSTABLE THERMAL-MAGNETIC TYPE.

A LOW VOLTAGE FIXED MOUNTED MOLDED CASE CIRCUIT BREAKER WITH A 1200 AMPERE FRAME AND A 1000 AMPERE TRIP RATING.
TRIP UNIT IS ADJUSTABLE SOLID-STATE TYPE WITH LONG-TIME, SHORT-TIME, INSTANTANEOUS, GROUND FAULT AND ARC-FLASH REDUCTION PROTECTION FEATURES.

DETAIL C



A LOW VOLTAGE, DRAWOUT, POWER OR INSULATED CASE CIRCUIT BREAKER WITH A 1600A FRAME AND SOLID-STATE TRIP UNIT.
TRIP UNIT HAS A SENSOR MODULE RATED FOR 1000 AMPERES AND WITH A TRIP RATING OF 800 AMPERES AND ARC-FLASH REDUCTION PROTECTION FEATURES.

CONDUIT & WIRING INSTALLATION LEGEND

- CONDUIT EXPOSED
- CONDUIT CONCEALED
- CONDUIT TURNING UP. CONDUIT TURNING DOWN.
- CONDUIT PLUGGED FLUSH. CONDUIT CAPPED.
- L2 - 5 — TYPICAL FOR HOME RUN TO BE ROUTED TO LIGHTING PANEL L2 & CONNECTED TO CIRCUIT #5 (MINIMUM NO. 12 AWG CONDUCTORS AND 3/4" CONDUIT)
- A — LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE
- 11 — LINEAR FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE.
- LP1-3 — RECEPTACLE POWERED FROM LIGHTING PANEL LP1, CIRCUIT 3
- A LP2-2 — LIGHTING FIXTURE POWERED FROM LIGHTING PANEL LP2, CIRCUIT 2 (NON-SWITCHED)
- LPA-4 A / 11 — LIGHTING FIXTURE POWERED FROM LIGHTING PANEL LPA, CIRCUIT 4, VIA SWITCH A
- E — UNDERGROUND CONCRETE ENCASED ELECTRICAL DUCT BANK
- UNDERGROUND CONCRETE ENCASED ELECTRICAL BANK ROUTED BENEATH SLAB-ON-GRADE
- EE — DIRECT BURIED CONDUIT
- GROUND CONDUCTOR
- UE — UE — UNDERGROUND ELECTRIC
- OH — OH — OVERHEAD CIRCUIT

COMMUNICATION SYMBOLS

- HORN SPEAKER
- DUAL HORN SPEAKER
- WALL MOUNTED CONE SPEAKER
- SK — CEILING MOUNTED CONE SPEAKER

PROTECTION/RELAY DEVICE NUMBERS

- 25 - SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE
- 27 - UNDERVOLTAGE RELAY
- 32 - DIRECTIONAL POWER RELAY
- 37 - UNDERCURRENT OR UNDERPOWER RELAY
- 46 - REV. PHASE OR PHASE-BAL. CURRENT RELAY
- 47 - PHASE SEQ. OR PHASE BAL. VOLTAGE RELAY
- 49 - MACHINE OR TRANSFORMER THERMAL RELAY
- 50 - INSTANTANEOUS OVERCURRENT
- 51 - AC TIME OVERCURRENT RELAY
- 52 - AC CIRCUIT BREAKER
- 59 - OVERVOLTAGE RELAY
- 63 - PRESSURE SWITCH
- 64 - GROUND DETECTOR RELAY
- 67 - AC DIRECTIONAL OVERCURRENT RELAY
- 71 - LIQUID OR GAS LEVEL RELAY
- 81 - FREQUENCY RELAY
- 83 - AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY
- 86 - LOCKOUT RELAY
- 87 - DIFFERENTIAL PROTECTIVE RELAY

CONTROL SCHEMATIC LEGEND

- PS — FIRE ALARM PULL STATION
- F — FIRE ALARM HORN/STROBE LIGHT
- F — FIRE ALARM BEACON
- S — FIRE ALARM STROBE LIGHT
- SD — FIRE ALARM SYSTEM SMOKE DETECTOR
- HT — FIRE ALARM SYSTEM HEAT SENSOR
- SFS — FIRE ALARM SYSTEM SPRINKLER FLOW SWITCH
- STS — FIRE ALARM SYSTEM SPRINKLER TAMPER SWITCH
- SPS — FIRE ALARM SYSTEM SPRINKLER PRESSURE SWITCH
- FACP — FIRE ALARM CONTROL PANEL
- FAAP — FIRE ALARM ANNUNCIATOR PANEL
- FATC# — FIRE ALARM TERMINAL CABINET
- DSD — FIRE ALARM SYSTEM DUCT SMOKE DETECTOR
- PIV — FIRE ALARM SYSTEM POST INDICATOR VALVE SWITCH
- PET — PHOTO ELECTRIC BEAM TRANSMITTER (SECURITY SYSTEM). ARROW INDICATES DIRECTION OF BEAM.
- PER — PHOTO ELECTRIC BEAM RECEIVER. (SECURITY SYSTEM). ARROW INDICATES DIRECTION OF BEAM.
- SSCP — SECURITY SYSTEM CONTROL PANEL
- MS — MOTION SENSOR
- CS — CONTACT SWITCH (DOOR)
- DS — DOOR SWITCH
- KC — CARD READER

NO.	BY	CK	APP
A	AD	RDT	MT
B	AD	MM	RDT
C	AD	RDT	MT
D	AD	RE	MT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL
JULY 2018	30% SUBMITTAL

50.3060 - Electrical Diagrams Drawings

XREF1: E-01.dwg
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XREF3:
XREF4:

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

ELECTRICAL LEGEND

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 198898

E-01
SHEET 13 OF 35

FD7000
198898

ELECTRICAL GENERAL NOTES

1. SOLID LINES (————————) INDICATE NEW WORK OR EQUIPMENT.
2. SCREENED LINES (————————) INDICATE EXISTING WORK OR EQUIPMENT.
3. DASHED LINES (- - - - - - - -) INDICATE FUTURE WORK OR EQUIPMENT.
4. REFER TO INDIVIDUAL DISCIPLINE CONTRACT DRAWINGS FOR ADDITIONAL ABBREVIATIONS, DETAILS, AND GENERAL DESIGN NOTES.
5. LEGEND SHEETS ARE GENERAL. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
6. INFORMATION RELATED TO CIRCUIT IDENTIFICATION, WIRE & CONDUIT SIZES, AND ROUTING, IS ON THE FOLLOWING DRAWING TYPES.
   - A. ONE-LINE DIAGRAMS SHOW CIRCUIT IDENTIFICATION, WIRE QUANTITY AND SIZES, AND CONDUIT SIZE WITHIN STRUCTURES. ONE-LINE DIAGRAMS ALSO INDICATE ORIGIN AND DESTINATION OF CIRCUITS, AND IDENTIFY CIRCUITS ROUTED UNDERGROUND.
   - B. FOR CIRCUITS WITHOUT UNDERGROUND PORTIONS, BUILDING FLOOR PLANS SHOW LOCATION OF EQUIPMENT FOR DETERMINING CIRCUIT LENGTH WITHIN THE STRUCTURE. FOR CIRCUITS WITH UNDERGROUND PORTIONS, ANTICIPATED PENETRATION OF UNDERGROUND CONDUITS ARE SHOWN ON STRUCTURE PLANS FOR DETERMINING THE LENGTH OF THE IN-STRUCTURE PORTIONS OF CIRCUITS. BUILDING FLOOR PLANS MAY ALSO SHOW HOME RUNS FOR LIGHTING, RECEPTACLE, AND OTHER MISCELLANEOUS EQUIPMENT CIRCUITS.
   - C. SITE PLANS INDICATE THE GENERAL ROUTING OF UNDERGROUND CONDUITS AND DUCT BANKS. CIRCUITS ROUTED IN UNDERGROUND CONDUITS OR DUCT BANKS ARE INDICATED IN DUCT BANK SECTIONS REFERENCED ON THE SITE PLAN.
   - D. DUCT BANK SECTIONS AND SCHEDULES IDENTIFY CONDUIT SIZE, CONDUIT MATERIAL, ARRANGEMENT OF THE UNDERGROUND CONDUITS, AND CIRCUITS ROUTED IN EACH UNDERGROUND CONDUIT.

AREA DESIGNATIONS

THE SPECIAL AREA DESIGNATION BOXES, AS DEFINED BELOW, ARE LOCATED ON THE PLAN DRAWINGS TO DEFINE ELECTRICAL INSTALLATION REQUIREMENTS. DESIGNATION BOXES ARE LOCATED WITHIN ROOM OR BELOW ROOM NUMBER. ALL INDOOR AREAS NOT INDICATED OTHERWISE ARE AREA TYPE 1 AND MINIMUM NEMA TYPE 1 ENCLOSURES.

AREA TYPE 1A	CORROSIVE CHEMICAL FEED AND STORAGE ROOMS. CONDUIT SYSTEM SHALL BE EXPOSED SCHEDULE 80 PVC RIGID NON-METALLIC CONDUIT WITH PVC FITTINGS, BOXES AND ACCESSORIES.
AREA TYPE 4	INDOOR WET LOCATIONS SUCH AS VAULTS, HOSEDOWN AREAS, BASEMENTS, ETC. MINIMUM NEMA TYPE 4 ENCLOSURE FOR EQUIPMENT AND GASKETED FITTINGS IN A CONDUIT SYSTEM.
AREA TYPE 7A	CLASS I, DIVISION 1 AREA AS DEFINED BY NEC. ALL EQUIPMENT AND CONDUIT SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 7B	CLASS I, DIVISION 2, GROUP C AND D (METHANE, GASOLINE) AS DEFINED BY NEC. EQUIPMENT AND CONDUITS SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 12	INDOOR, DRY, DIRTY AREA. REQUIRES MINIMUM NEMA TYPE 12 GASKETED ENCLOSURES FOR ALL EQUIPMENT AND GASKETED FITTINGS IN CONDUIT SYSTEMS.

GENERAL REQUIREMENTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING ALL CONDUITS NOT SHOWN ON THE PLANS. THIS SHALL INCLUDE ALL CONDUITS SHOWN ON THE ONE-LINES AND HOME-RUNS SHOWN ON THE PLAN DRAWINGS. CONDUITS SHALL BE ROUTED AS DEFINED IN THE SPECIFICATION.
2. SPARE WIRES SHALL BE TAPED AND COILED AND LABELED TO INDICATE WHERE OTHER END OF SPARE WIRE IS LOCATED.
3. IF EQUIPMENT SUPPLIED BY MANUFACTURER HAS A LARGER LOAD THAN VALUE SHOWN, THE CABLE CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE ENLARGED, AS REQUIRED, TO ACCOMMODATE THE HIGHER VALUE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING PROPERLY SIZED STARTER OVERLOADS FOR EQUIPMENT FURNISHED.
5. LIGHTING AND RECEPTACLE CIRCUITS DESIGNATED ON THE FLOOR PLANS ARE NOT SHOWN ON THE ONE-LINES. CONDUCTORS FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM NO. 12AWG. CONDUIT FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM 3/4".
6. IN AREAS WHERE THERE ARE OVERHEAD BRIDGE CRANES, HOISTS, ETC. NO CONDUITS SHALL BE RUN OVERHEAD THAT WILL INTERFERE WITH THE OPERATION OF THE EQUIPMENT.

ELECTRICAL ABBREVIATIONS

A

A	AMBER, AMPERE, ALARM
AC	ALTERNATING CURRENT
ACB	AIR CIRCUIT BREAKER
ACR	ACCESS CARD READER
AF	AMPERE FRAME
AFD	ADJUSTABLE FREQUENCY DRIVE
AFRD	ARC-FLASH REDUCTION DEVICE
AM	AMMETER
ANN	ANNUNCIATOR
AR	ALARM RELAY
AS	AMMETER SWITCH, AMPERE SENSOR
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE

B

B	BUS
BC	BATTERY CHARGER
BKR	BREAKER
BR	BRAKE
BT	BEARING TEMPERATURE

C

C	CLOSE, COUNTER, CONTACTOR, CONTROL, CCTV CAMERA
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CB"A"	CIRCUIT BREAKER AUXILIARY CONTACT (OPEN WHEN BREAKER IS OPEN)
CB"B"	CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS OPEN)
CD	CONTROL DAMPER
CHH	CONTROL HANDHOLE
CI	CELL INTERLOCK
CKT	CIRCUIT
CL2	CHLORINE
CMH	CONTROL MANHOLE
COS	CABLE OPERATED SWITCH
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CURRENT OF CONTROL RELAY, CARD READER
CS	CONTROL STATION
CT	CYCLE TIMER OR CURRENT TRANSFORMER
CTC	CYCLE TIMER CLUTCH
CTM	CYCLE TIMER MONITOR
2/C	2 CONDUCTOR
4"C	4" CONDUIT

D

DC	DIRECT CURRENT, DOOR CONTACT
DI	DOOR INTERLOCK
DM	DAMPER MOTOR, DEMAND METER, DIMMER SWITCH
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DPR	DIFFERENTIAL PRESSURE REGULATOR
DPS	DIFFERENTIAL PRESSURE SWITCH
DS	DISCONNECT SWITCH, DOOR SWITCH, DESKTOP STATION
DVLS	DISCHARGE VALVE LIMIT SWITCH

E

E	ELECTRIC OPERATOR FOR CONTROL DAMPER OR VALVE
EC	EMPTY CONDUIT
EDS	ELECTRICAL DOOR STRIKE
EG	ENGINE GENERATOR
EGCP	ENGINE GENERATOR CONTROL PANEL
EL	ELEVATION, EMERGENCY LIGHT
EMH	ELECTRICAL MANHOLE
ER	ELECTRODE RELAY
ES	END SWITCH, REQUEST TO EXIT SENSOR
E-STOP	EMERGENCY STOP
ETM	ELAPSED TIME METER
EX	EXISTING
EXP	EXPLOSION PROOF

F

F	FORWARD, FIELD
FO	FIBER OPTIC
FPR	FEEDER PROTECTION RELAY
FS	FLOW SWITCH

G

G	GREEN, GROUND, GENERATOR, GROUND FAULT
GD	GROUND DETECTOR
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTOR
GLS	GEARED LIMIT SWITCH
GPR	GENERATOR PROTECTION RELAY
GND	GROUND
#8G	#8 GROUND WIRE

H

H	HIGH, HUMIDISTAT
HH	HANDHOLE
HMT	HIGH MOTOR TEMPERATURE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HP	HORSEPOWER
HS	HAND STATION
HWCO	HIGH WATER CUTOFF
HZ	HERTZ (CYCLE)

I

I/O	INPUT/OUTPUT
I	INSTANTANEOUS
IJB	INTERCOM JUNCTION BOX

J

J,JB	JUNCTION BOX

K

K	KEY INTERLOCK
KAIC	THOUSAND AMPERES INTERRUPTING CURRENT
KCMIL	THOUSAND CIRCULAR MIL
KO	KEY OPERATED
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVAR
KW	KILOWATT
KWH	KILOWATT HOUR

L

L	LOW, LEVEL, LONG-TIME
LA	LIGHTNING ARRESTER
LAN	LOCAL AREA NETWORK
LC	LIGHTING CONTRACTOR
LCP	LOCAL CONTROL PANEL
LCS	LOCAL CONTROL STATION
LOA	LOCAL-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LOS	LOCK OUT STOP
LP	LIGHTING PANEL
LS	LIMIT OR LEVEL SWITCH
LTG	LIGHTING
LVHH	LOW VOLTAGE HANDHOLE
LVMH	LOW VOLTAGE MANHOLE
LWCO	LOW WATER CUTOFF

M

M	MAGNETIC MOTOR STARTER
MA	MILLIAMPERE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCLU	MOTOR CONTROL LINEUP
MD	MOISTURE DETECTOR, MOTION DETECTOR
MDL	MAGNETIC DOOR LOCK
MFR	MANUFACTURER
MH	MANHOLE, MOUNTING HEIGHT
MOV	MOTOR OPERATED VALVE
MPR	MOTOR PROTECTION RELAY
MS	MANUAL MOTOR STARTER
MSH	MOTOR SPACE HEATER
MTS	MANUAL TRANSFER SWITCH
MV	MILLIVOLT, MEDIUM VOLTAGE
MVA	MEGAVOLT AMPERE
MVHH	MEDIUM VOLTAGE HANDHOLE

N

N	NEUTRAL
NGR	NEUTRAL GROUNDING RESISTOR
NGT	NEUTRAL GROUNDING TRANSFORMER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER

O

O	OPEN
OL	OVERLOAD
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
O/U	OVER/UNDER

P

P	PRIMARY, POWER, POLE
PCS	PLANT CONTROL SYSTEM
PB	PUSH BUTTON, PULL BOX
PF	POWER FACTOR
PFCC	POWER FACTOR CORRECTION CAPACITOR
PH	PHASE
PL	PILOT LIGHT
PLC	PROGRAMMABLE LOGIC CONTROLLER
PP	POWER PANEL
PR	PAIR
PRS	PROXIMITY SWITCH
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER, PROGRAM TIMER

Q

	NOT USED

R

R	RED, RAISE, RELAY, REVERSE
RECP	RECEPTACLE
RES	RESISTOR
RH	REMOTE HANDSET
RT	REPEATING TIMER
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TERMINAL UNIT
RVSS	REDUCED VOLTAGE SOLID STATE STARTER

S

S	SHORT-TIME, SHIELDED, STARTER
SA	SURGE ARRESTER, SPEAKER AMPLIFIER
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SF6	SULFUR HEXAFLOURIDE
SH	SPACE HEATER
SN	SOLID NEUTRAL
SO	SOLENOID OILER
SP	SINGLE POLE
SPD	SURGE PROTECTION DEVICE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SS	SELECTOR SWITCH, START/STOP
SSM	SOLID-STATE METERING
SSS	SOLID STATE STARTER
SST	SOLID-STATE TRIP
SUPV	SUPERVISORY CONTROL
SV	SOLENOID VALVE
SWB,SWBD	SWITCHBOARD
SWG,SWGR	SWITCHGEAR

T

T	THERMOSTAT, TIMER, TOTALIZER, TRANSFORMER
TACH	TACHOMETER
TB	TERMINAL BLOCK
TC	TIMER CLUTCH
TD	TIME DELAY RELAY
TEMP	TEMPERATURE
TM	TIMER MOTOR
TQ	TORQUE
TR	TIMER RELAY, TRIAD
TS	TEMPERATURE SWITCH
TTB	TELEPHONE TERMINAL BOARD

U

UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
UTS	UP TO SPEED

V

V	VOLTS, VOLTAGE RESTRAINED
VA	VOLT AMPERE
VAR	VARMETER
VFD	VARIABLE FREQUENCY DRIVE
VI	VACUUM INTERRUPTER
VLS	VALVE LIMIT SWITCH
VM	VOLTMETER
VPI	VALVE POSITION INDICATOR
VS	VOLTMETER SWITCH

W

W	WHITE, WATTS
WH	WATTHOUR METER
WM	WATT METER
WP	WEATHERPROOF
WPI	WEATHERPROOF IN-USE
WS	WALL STATION

X

X	AUXILIARY RELAY
XFMR	TRANSFORMER
XP	EXPLOSION PROOF

Y

Y	YELLOW

Z

Z	AUXILIARY RELAY, IMPEDANCE
ZS	POSITION SWITCH
ZSS	ZERO SPEED SWITCH
1-1PR#16S	ONE, SINGLE PAIR, TWISTED SHIELDED #16 CABLE
3-7/C#14	THREE, SINGLE, SEVEN CONDUCTOR #14 MULTICONDUCTOR CONTROL CABLES
1-1TR#16S	ONE, TRIAD, TWISTED SHIELDED #16 CABLE

NO.	BY	CK	APP
A	AD	MM	RDT

REVISIONS AND RECORD OF ISSUE

DATE	
JULY 2018	30% SUBMITTAL
50.3040 - General Drawings	
E-02.dwg	

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

ELECTRICAL
ABBREVIATIONS AND NOTES

DESIGNED: RDT
DETAILED: AD
CHECKED: MM
APPROVED: RDT
DATE: JULY 2018

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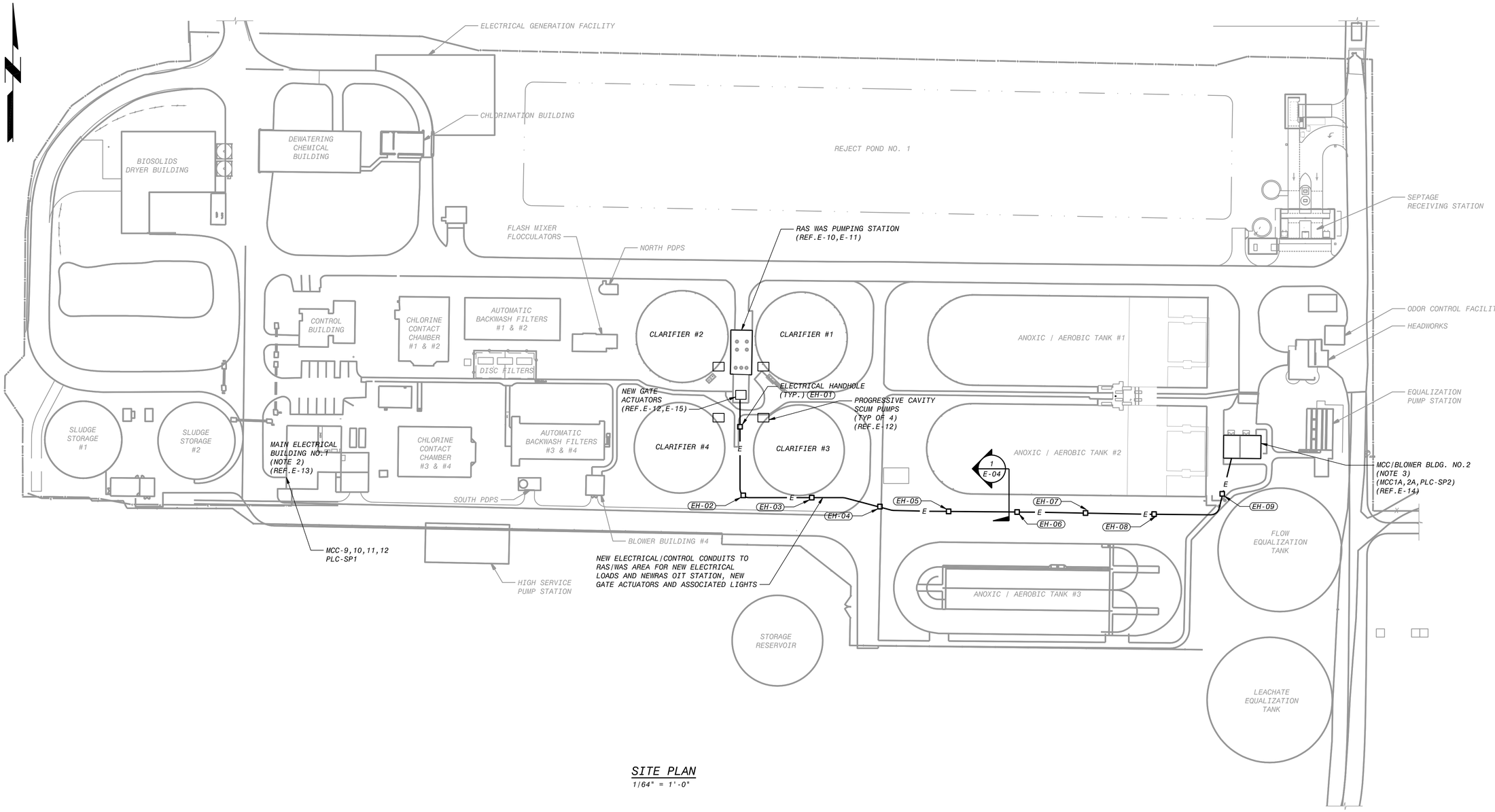
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

E-02
SHEET
14 OF 35

FD7000
198898



SITE PLAN

1/64" = 1'-0"

750' 375' 0 750' 1500'

1/64" = 1'-0"

NOTES:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL NOTES.
2. EXISTING RAS/WAS PUMP VFDs INSIDE ELECTRICAL ROOM #1 SHALL BE DEMOLISHED AND REPLACED AS INDICATED.
3. MCC'S IN MCC BUILDING #2 WILL BE USED FOR POWERING NEW EQUIPMENT, INCLUDING SCUM PUMPS, ELECTRIC GATE ACTUATORS, AND MISCELLANEOUS LIGHTING. REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL DETAILS.
4. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF EXISTING LIGHTING POLES AT GATE ACTUATOR. AND REPLACE 3 NOS. EXISTING HPS LIGHT FIXTURE BY LED FIXTURE NO.1 INDICATED IN E-04 LIGHTING FIXTURE SCHEDULE ON EXISTING LIGHT POLES.

NO.	BY	CK	APP
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C	AD	RDT	MT
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SEPT 2018	60% SUBMITTAL
JULY 2018	30% SUBMITTAL

50.3060 - Electrical Diagrams Drawings

E-03.dwg

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SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
SITE PLAN

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

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E-03
SHEET
15 OF 35

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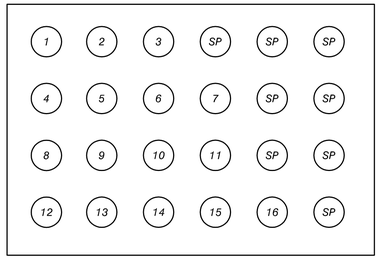
DUCT BANK SCHEDULE

COND. NO.	COND. SIZE	TYPE OF CABLE - POWER/ CONTROL/ SIGNAL	CKT NO	LOAD
1	2"	P	MCC1A-7	SCUM PUMP STARTER PANEL (SP-202)
2	2"	P	MCC1A-8	SCUM PUMP STARTER PANEL (SP-204)
3	2"	P	MCC1A-9	GATE ACTUATOR
4	2"	P	MCC1A-10	GATE ACTUATOR
5	2"	P	MCC2A-7	SCUM PUMP STARTER PANEL (SP-201)
6	2"	P	MCC2A-8	SCUM PUMP STARTER PANEL (SP-203)
7	2"	P	MCC2A-9	GATE ACTUATOR
8	2"	P	MCC2A-10	GATE ACTUATOR
9	2"	P	MCC2A-11	GATE ACTUATOR
10	2"	P		SPARE
11	2"	P	PT/TC2A-11	NEW RAS WAS OIT
12	2"	C	PLCSP2-1	SCUM PUMP CONTROL PANEL 1 LCP-201
13	2"	C	PLCSP2-2	SCUM PUMP CONTROL PANEL 2 LCP-202
14	2"	C	PLCSP2-3	SCUM PUMP CONTROL PANEL 3 LCP-203
15	2"	C	PLCSP2-4	SCUM PUMP CONTROL PANEL 4 LCP-204
16	2"	FO CABLE	PLCSP2-5	NEW RAS WAS OIT
SP	2"	P/C		SPARE

NTS



NTS

1
E-03

LIGHTING FIXTURE SCHEDULE

FIXTURE	LAMP	MTG HGT	DESCRIPTION	MANUFACTURER
1	LED 209W 22,047 LUMENS	MOUNTED ON EXISTING POLE	209W LED OUTDOOR AREA LIGHT, SINGLE-PIECE DIE-CAST ALUMINUM HOUSING, INTEGRAL HEAT SINK, ZINC-INFUSED SUPER DURABLE TGIC THERMOSET POWDER COAT FINISH, T3M OPTICS, 5000K, NIGHT TIME FRIENDLY PRODUCT, MAST ARM POLE MOUNTED, 480V	LITHONIA #DSX1 LED 60C 1000 50K T3M 480 MA DBLXD
2	LED 67W 5208 LUMENS	AS NOTED ON PLANS	67 WATT WALL MOUNTED LED LUMINARIE, DIE-CAST ALUMINUM REAR HOUSING,UV-STABILIZED POLYCARBONATE FRONT HOUSING,TGIC THERMOSET POWDER COAT FINISH,MOISTURE AND CORROSION RESISTANT,IMPACT-RESISTANT TEMPERED GLASS LENS THAT IS FULLY GASKETED, SUPER DURABLE 50K, 120V 60HZ.	LITHONIA #TWP LED 30C 700 50K T3M 120 PE SF DBLXD

NTS

FD7000
198898

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A	AD	MM	RDT	SEPT 2018	60% SUBMITTAL

50.3060 - Electrical Diagrams Drawings
E-04.dwg
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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
DUCT BANK SECTION AND SCHEDULE
LIGHTING FIXTURE SCHEDULE

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

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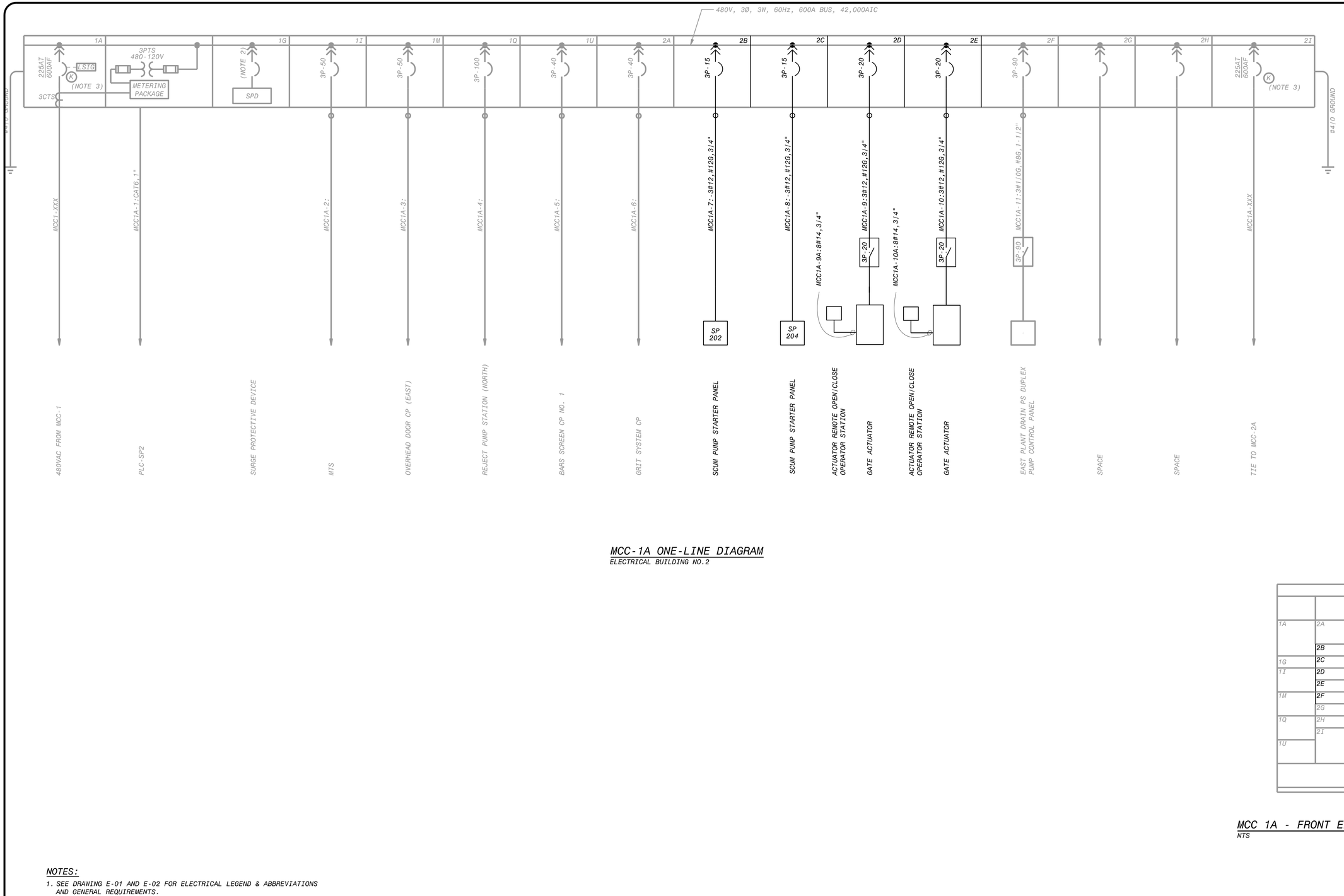
PROJECT NO.
198898

E-04
SHEET
16 OF 35



MCC-1A ONE-LINE DIAGRAM
ELECTRICAL BUILDING NO.2

MCC 1A - FRONT ELEVATION
NTS

NOTES:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. DISCONNECT SHALL BE SIZED BY MCC SUPPLIER.
3. KEY INTERLOCK TO ALLOW ONLY TWO OF THE THREE MAIN AND TIE BREAKERS ON MCC-1A AND MCC-2A TO BE CLOSED AT ANY ONE TIME.

		C	AD RE MT
		B	AD RDT MT
		A	AD MM RDT
		NO.	BY CK APP
FEB 2019	100% SUBMITTAL		
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SEPT 2018	60% SUBMITTAL		
DATE	REVISIONS AND RECORD OF ISSUE		

50-3060 - Electrical Diagrams Drawings
E-05.dwg
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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
MCC-1A POWER ONE-LINE DIAGRAM

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

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PROJECT NO.
198898

E-05
SHEET
17 OF 35

FD7000
198898

MCC-2A ONE-LINE DIAGRAM

ELECTRICAL BUILDING NO.2

MCC-2A - FRONT ELEVATION

NTS

NOTES:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. DISCONNECT SHALL BE SIZED BY MCC SUPPLIER.
3. KEY INTERLOCK TO ALLOW ONLY TWO OF THE THREE MAIN AND TIE BREAKERS ON MCC-1A AND MCC-2A TO BE CLOSED AT ANY ONE TIME.

NO.	BY	CK	APP
C	AD	RE	MT
B	AD	RDT	MT
A	AD	MM	RDT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50.3060 - Electrical Diagrams Drawings

E-06.dwg

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PLOTTED:GAM78713, 2/12/2019 3:27:42 PM
USER:GAM78713 DWG VER:1005

XREF1:
XREF2:
XREF3:
XREF4:

RICHARD D. TAYLOR
REGISTERED
No 33376
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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RAS/WAS PUMP STATION

ELECTRICAL
MCC-2A POWER ONE-LINE DIAGRAM

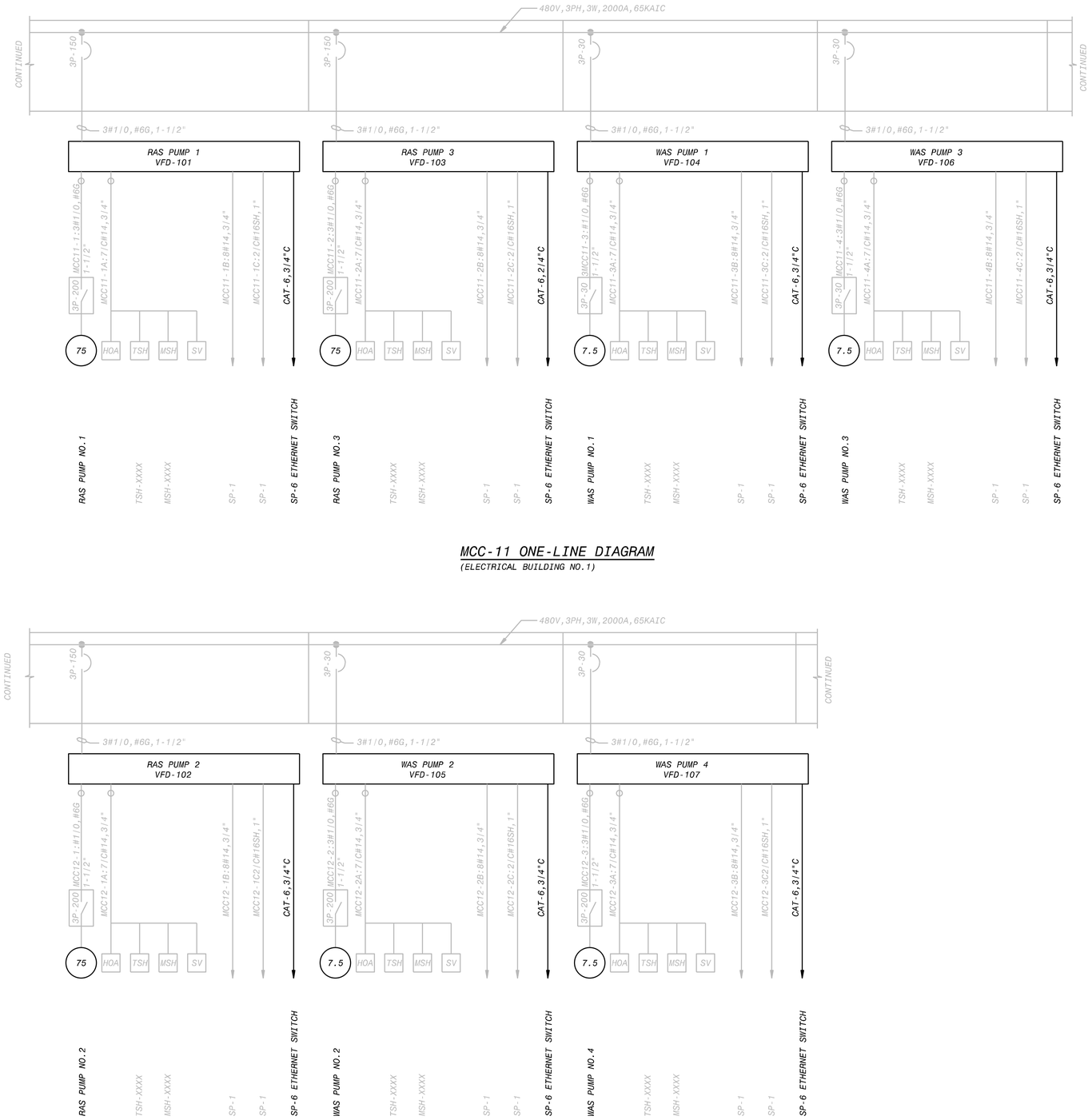
DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

E-06
SHEET
18 OF 35

FD7000
198898



MCC-11 ONE-LINE DIAGRAM

(ELECTRICAL BUILDING NO.1)

MCC-12 ONE-LINE DIAGRAM

(ELECTRICAL BUILDING NO.1)

NOTES:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. SEE E-08 FOR ADDITIONAL DETAILS.

NO.	BY	CK	APP
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A	AD	MM	RDT

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FEB 2019	100% SUBMITTAL
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SEPT 2018	60% SUBMITTAL

50.3060 - Electrical Diagrams Drawings

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PLOTTED:PATTY142, 21-08-2018 16:0
USER:ACH93836 DWG VER:1005

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MANATEE COUNTY, FLORIDA
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RAS/WAS PUMP STATION

ELECTRICAL
MCC-11 AND MCC-12 POWER ONE-LINE DIAGRAMS

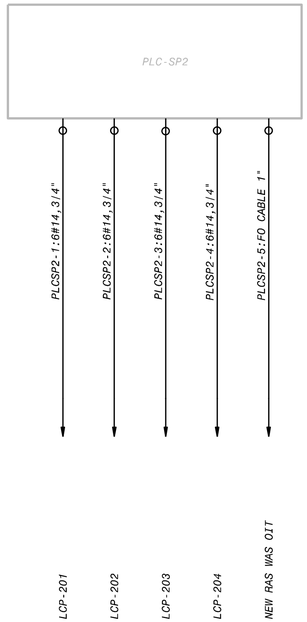
DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

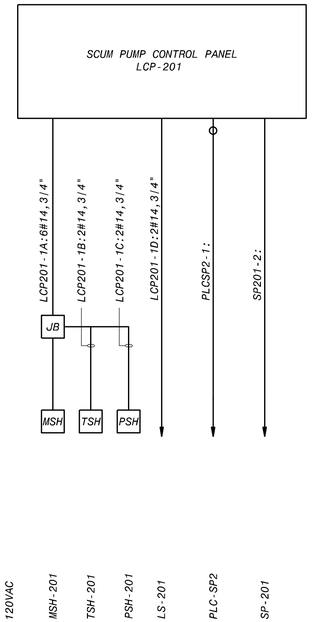
PROJECT NO.
198898

E-07
SHEET
19 OF 35

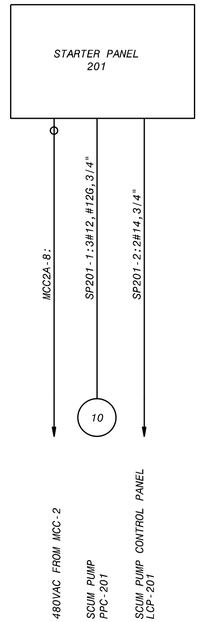
FD7000
198898



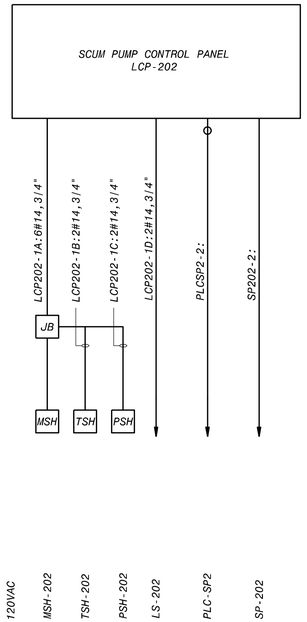
PLC-SP2 ONE-LINE DIAGRAM
(ELECTRICAL BUILDING NO.2)



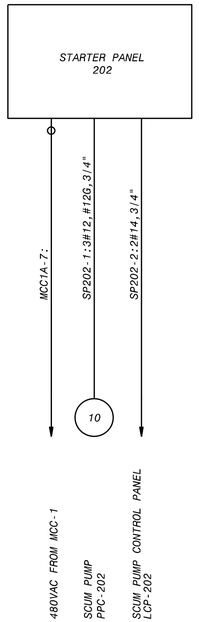
SCUM PUMP CONTROL PANEL LCP-201 ONE-LINE DIAGRAM
NTS



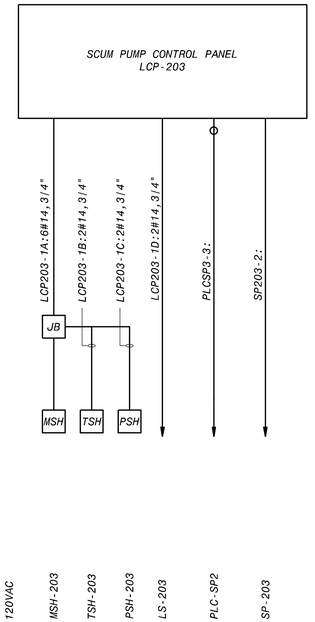
STARTER PANEL SP-201
NTS



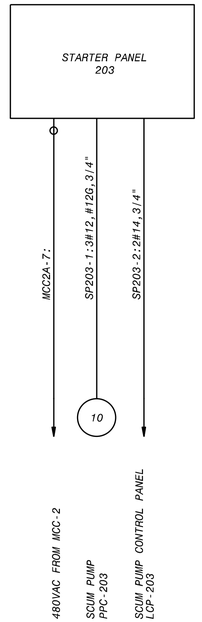
SCUM PUMP CONTROL PANEL LCP-202 ONE-LINE DIAGRAM
NTS



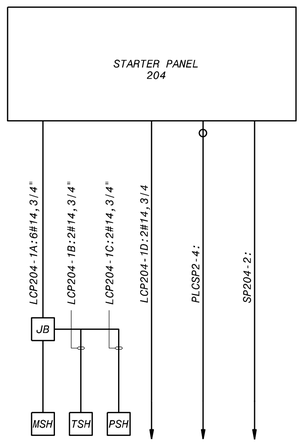
STARTER PANEL SP-202
NTS



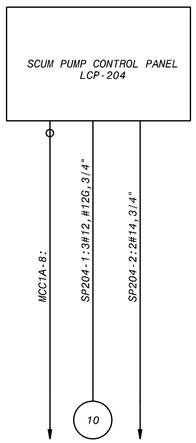
SCUM PUMP CONTROL PANEL LCP-203 ONE-LINE DIAGRAM
NTS



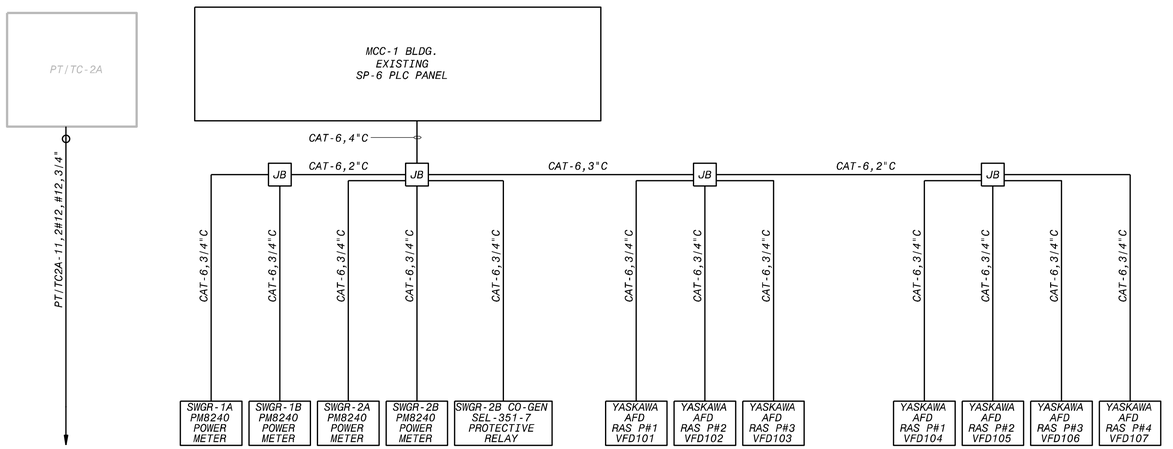
STARTER PANEL SP-203
NTS



SCUM PUMP CONTROL PANEL LCP-204 ONE-LINE DIAGRAM
NTS



STARTER PANEL SP-204
NTS



NOTE:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

NO.	BY	CK	APP
C	AD	RE	MT
B	AD	RDT	MT
A	AD	MM	RDT

DATE	REVISIONS AND RECORD OF ISSUE
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50.3060 - Electrical Diagrams Drawings

E-08.dwg

SAVED: GAWT8713, 2/12/2019 4:52:19 PM

PLOTTED:

USER: GAWT8713

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Certificate No. 8132

MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
CONTROL ONE-LINES

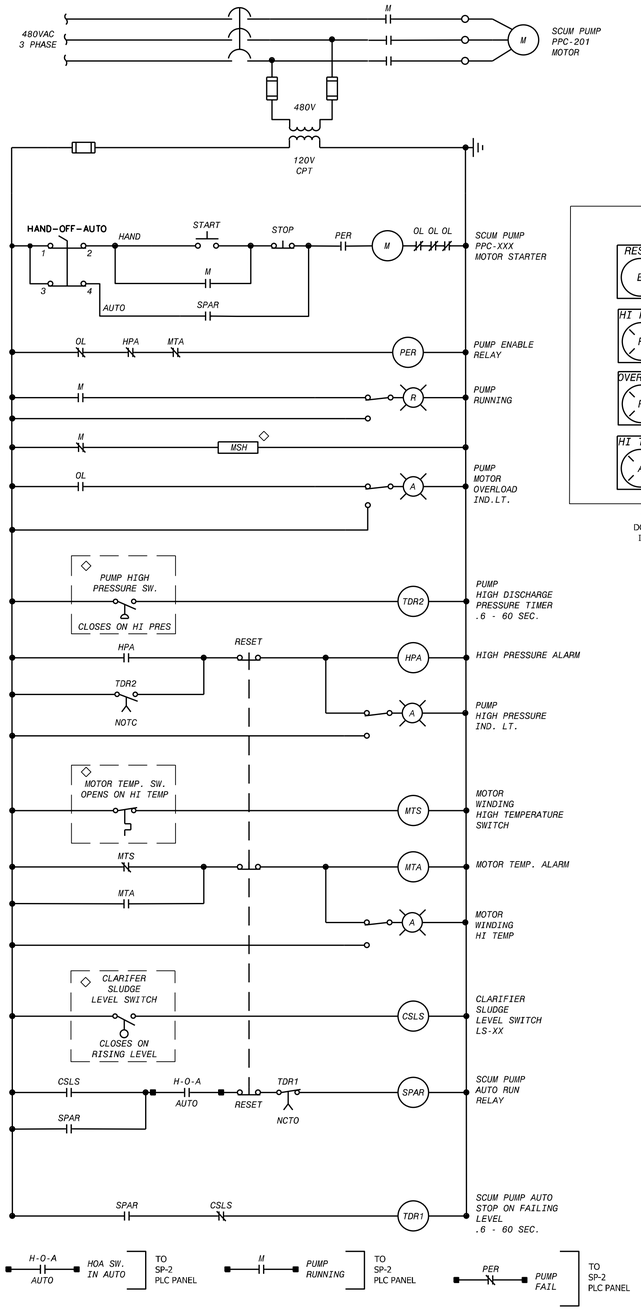
DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

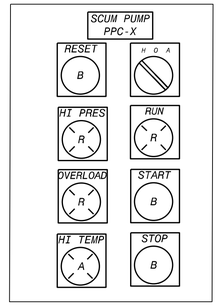
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

E-08
SHEET
20 OF 35

FD7000
198898

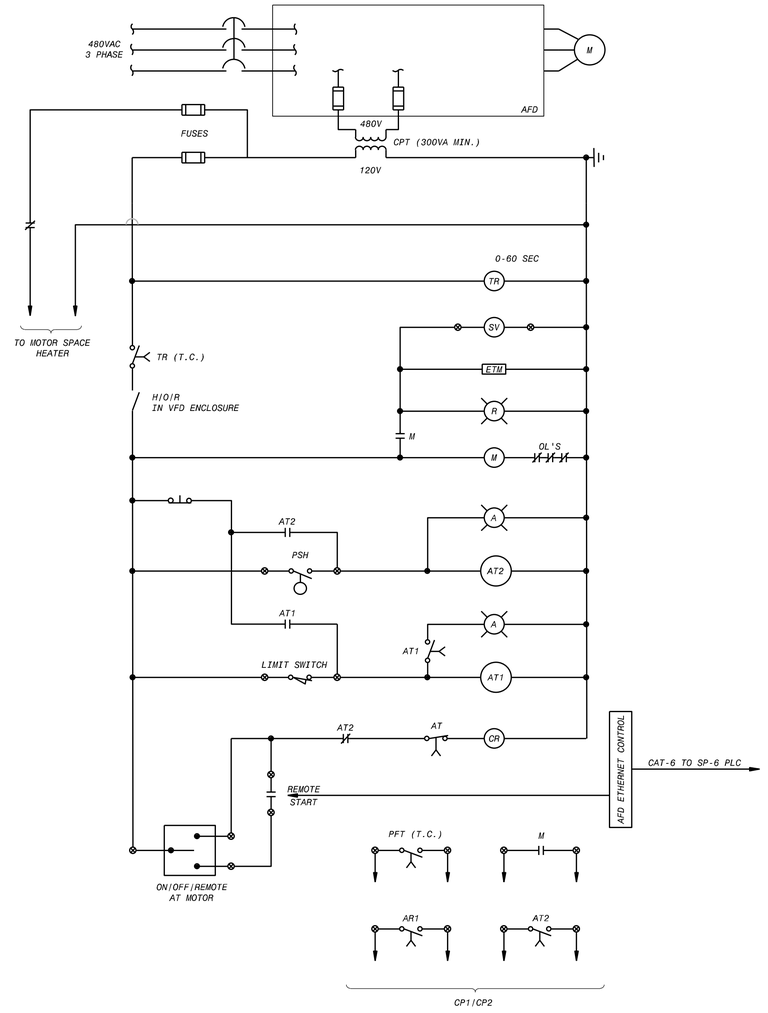




TYPICAL STARTER
DOOR PUSHBUTTON &
INDICATING LIGHTS
PPC-X

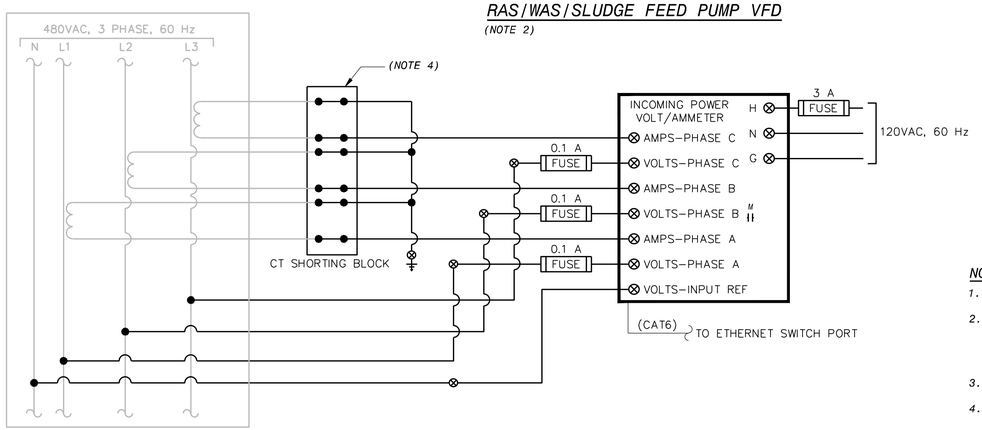
SCUM PUMP WIRING SCHEMATIC

(TYPICAL FOR PPC-202, PPC-203, PPC-204)



RAS/WAS/SLUDGE FEED PUMP VFD

(NOTE 2)



NOTES:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY FIELD WIRING AND CONNECT NEW AFD TO MATCH EXISTING VFD FUNCTIONALITY, REPLACEMENT AFD CONTROLLED VIA ETHERNET FROM SP-6 EXISTING COMPACTLOGIX PLC WITH IDENTICAL MONITORING AND CONTROL FUNCTIONS.
3. REPLACEMENT AFD CONTROLLED VIA ETHERNET FROM SP-6 EXISTING COMPACTLOGIX PLC.
4. ADD'CT SHORTING BLOCKS IF NONE EXIST.

NO.	BY	CK	APP
C	AD	RE	MT
B	AD	RDT	MT
A	AD	MM	RDT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50.3060 - Electrical Diagrams Drawings

E_00.dwg

SAVED:ACH95836, 2/21/2019 3:00:54 PM
PLOTTED:GAMTBT13, 9/11/2018 4:42:51 PM
USER:ACH95836

XREF1:
XREF2:
XREF3:
XREF4:
DWG VER:1000

HOWARD D. TAYLOR
PROFESSIONAL ENGINEER
LICENSE
No 33376
STATE OF FLORIDA

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
SCHEMATICS

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

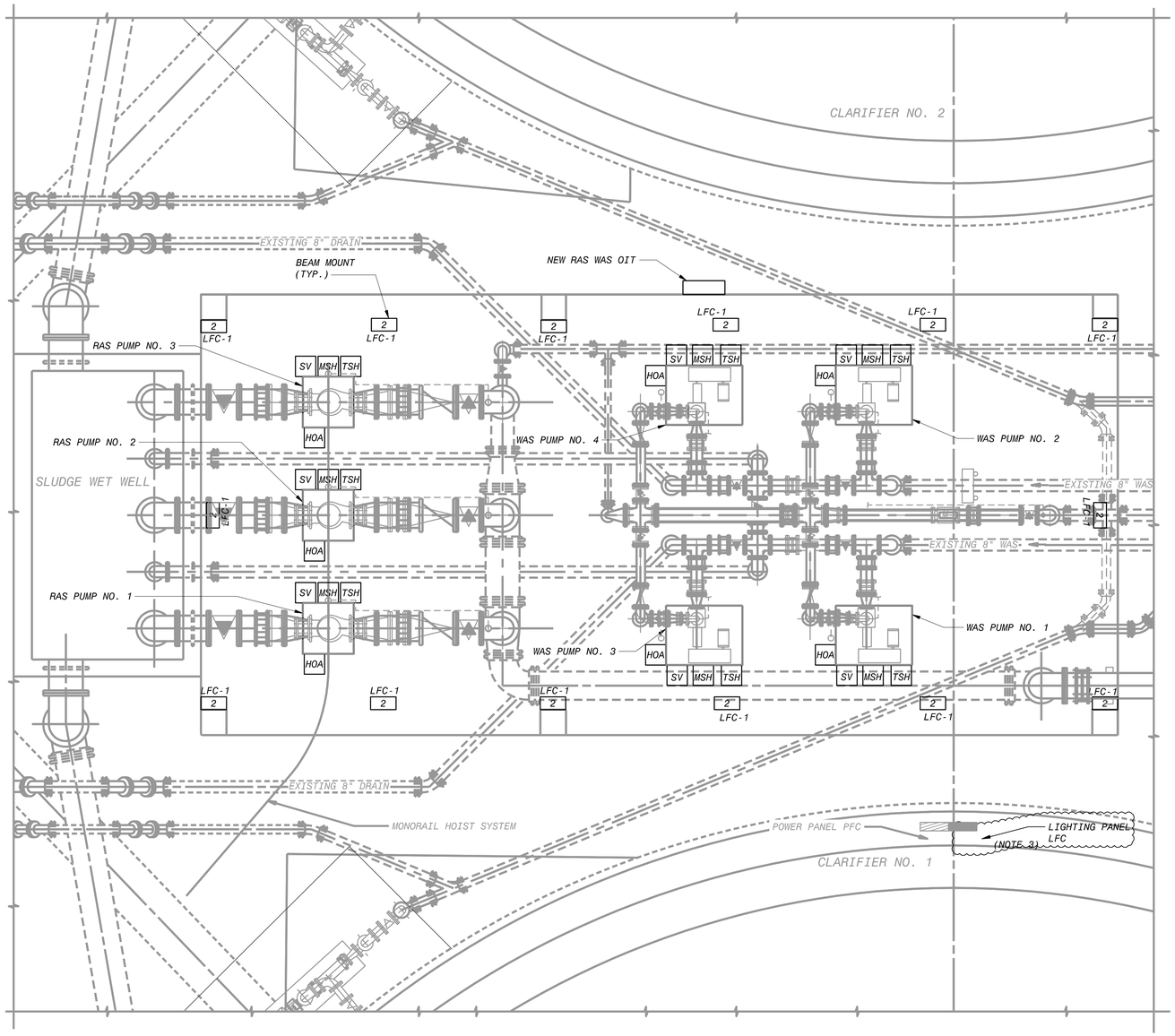
0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

E-09
SHEET
21 OF 35

FD7000
198898



RAS/WAS PUMP STATION - POWER AND LIGHTING PLAN

1/4" = 1'-0"

NOTES:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF EXISTING LIGHT FIXTURES. CONTRACTOR SHALL DISCONNECT & REMOVE EXISTING LIGHT FIXTURES SHOWN ON E-11. CONTRACTOR SHALL INSTALL NEW LED FIXTURE NO.2 ON EACH ON STRUCTURAL BEAMS AS SHOWN ON DRAWING. REPLACEMENT TYPE 2 FIXTURE TO BE POWERED FROM SAME SOURCES AS DEMOLISHED FLUORESCENT FIXTURES.
3. LIGHTING PANEL LFC INDICATED WITH CLOUD MARK WILL BE USED FOR REPOWRING NEW LIGHT FIXTURE NO.2.

4' 2' 0 4' 8'

1/4"=1'-0"

NO.	BY	CK	APP
C	AD	RE	MT
B	AD	RDT	MT
A	AD	MM	RDT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50-3060 - Electrical Diagrams Drawings

E-10.dwg

XREF1:
XREF2:
XREF3:
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SAVED: GWF78713, 2/12/2019 3:44:59 PM
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USER: GWF78713
DWG VER: 1005

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
RAS/WAS PUMP STATION-POWER & LIGHTING PLAN

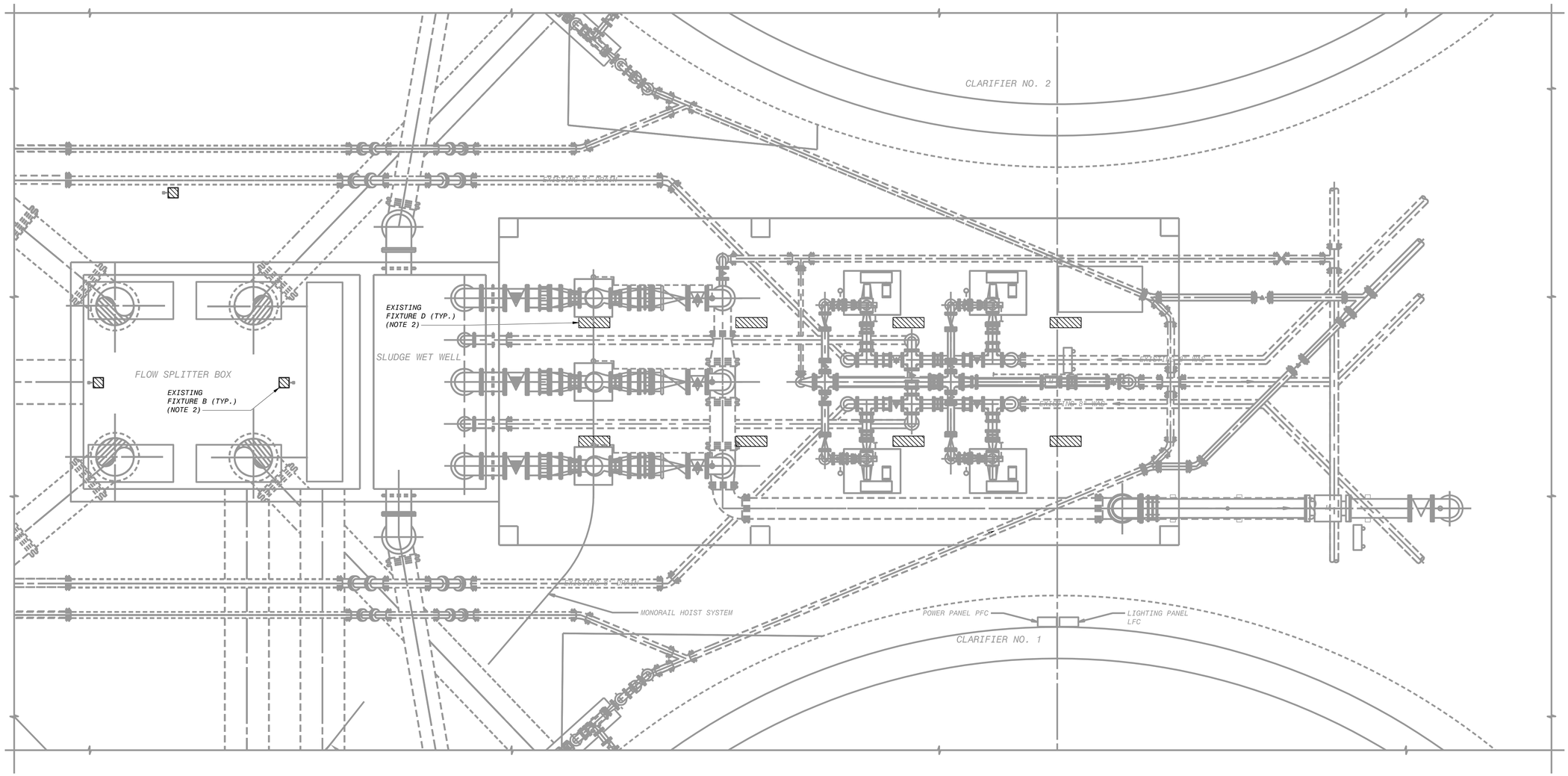
DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

E-10
SHEET
22 OF 35

FD7000
198898



DEMOLITION - RAS/WAS PUMP STATION AND FLOW SPLITTER BOX LIGHTING PLAN

1/4" = 1"-0"

LEGEND:

DEMOLITION WORK

NOTES:

1. SEE DRAWING E-1 AND E-2 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF EXISTING LIGHT FIXTURES. CONTRACTOR SHALL DISCONNECT & REMOVE EXISTING LIGHT FIXTURES. CONTRACTOR SHALL INSTALL NEW LED FIXTURE AS SHOWN ON E-10 & E-15. CONTRACTOR SHALL UTILIZE EXISTING LIGHTING CIRCUITS TO POWER REPLACEMENT FIXTURES.

4' 2' 0 4' 8'

1/4"=1'-0"

C	AD	RE	MT
B	AD	RDT	MT
A	AD	MM	RDT
NO.	BY	CK	APP

DATE	REVISIONS AND RECORD OF ISSUE
FEB 2019	100% SUBMITTAL
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SEPT 2018	60% SUBMITTAL

50-3060 - Electrical Diagrams Drawings

E-11.dwg

SAVED: GWF7871 3, 2/12/2019 3:45:21 PM
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USER: GWF7871 3
DWG VER: 1001

XREF1:
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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
DEMOLITION-RAS/WAS PUMP STATION AND FLOW SPLITTER BOX LIGHTING PLAN

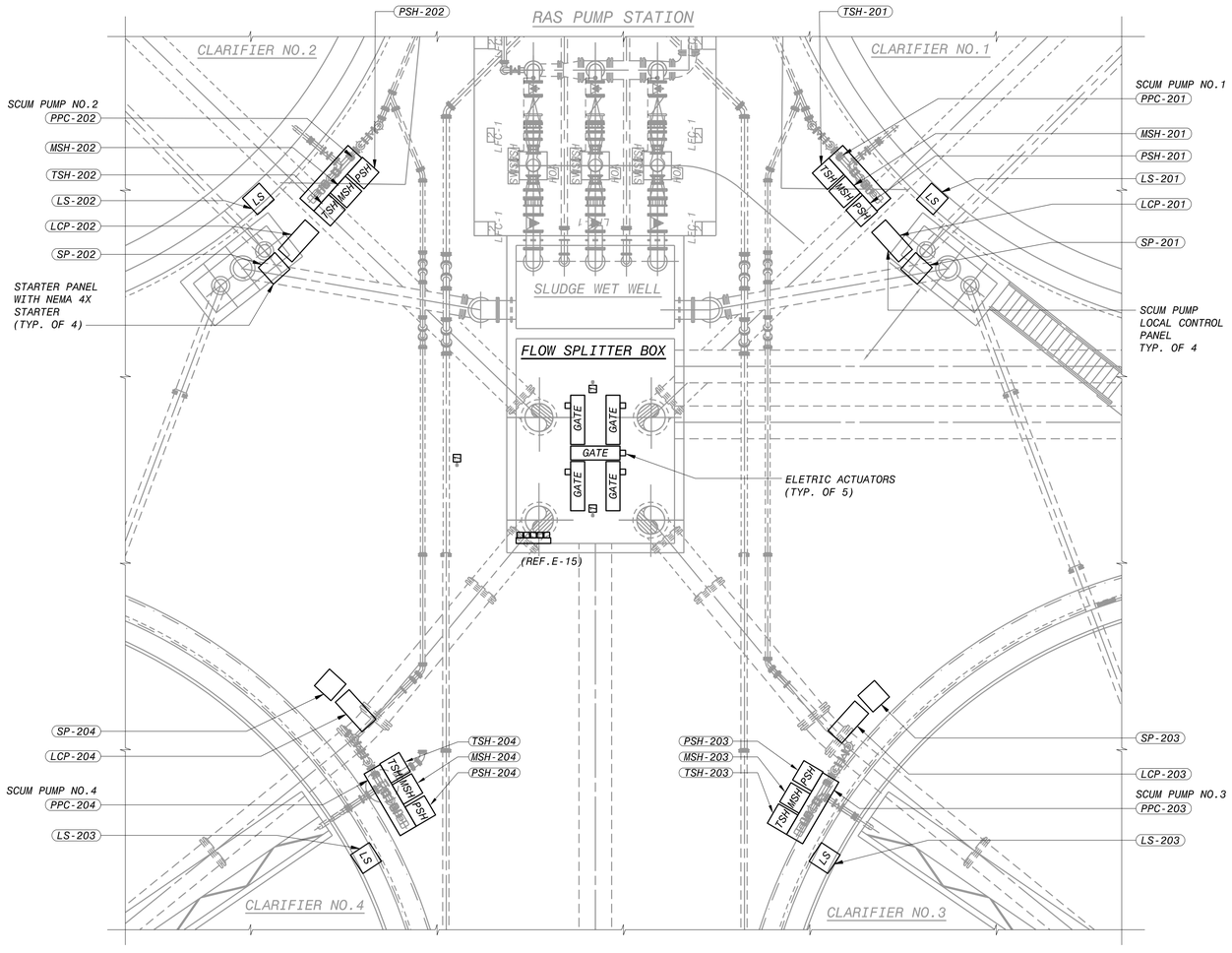
DESIGNED: DJ
DETAILED: AD
CHECKED: MM
APPROVED: RDT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

E-11
SHEET
23 OF 35

FD7000
198898



SCUM PUMP STATION POWER PLAN

1/8" = 1"-0"

NOTE:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

8' 4' 0 8' 16'

1/8"=1'-0"

NO.	BY	CK	APP
C	AD	RE	MT
B	AD	RDT	MT
A	AD	MM	RDT

DATE	REVISIONS AND RECORD OF ISSUE
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50.3060 - Electrical Diagrams Drawings

E-12.dwg

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XREF2:
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XREF4:

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PLOTTED:MUDS7788, 14-11-2018 17:05:57
USER:GAW78713 DWG VER:1003

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
SCUM PUMP STATION POWER PLAN

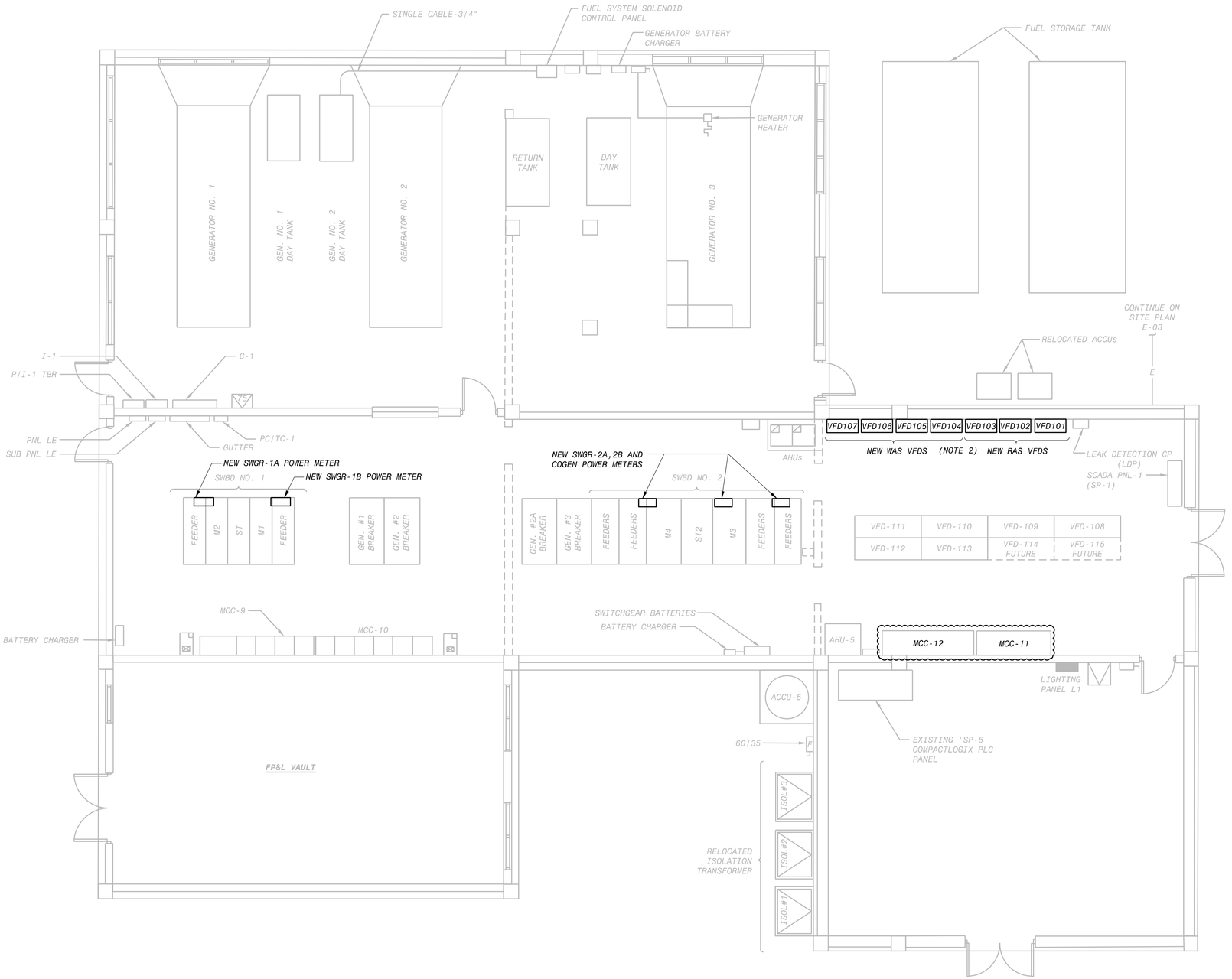
DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

E-12
SHEET
24 OF 35

FD7000
198898



NOTES:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL NOTES.
2. EXISTING RAS/WAS PUMP VFDs INSIDE ELECTRICAL ROOM #1 SHALL BE DEMOLISHED AND REPLACED AS INDICATED.

ELECTRICAL BUILDING NO.1 POWER PLAN
NTS

NO.	BY	CK	APP
C	AD	RE	MT
B	AD	RDT	MT
A	AD	MM	RDT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50.3060 - Electrical Diagrams Drawings
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USER:ACH95836
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XREF1:
XREF2:
XREF3:
XREF4:

RICHARD D. TAYLOR LICENSE No 33376 STATE OF FLORIDA PROFESSIONAL ENGINEER

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
ELECTRICAL BUILDING NO.1 POWER PLAN

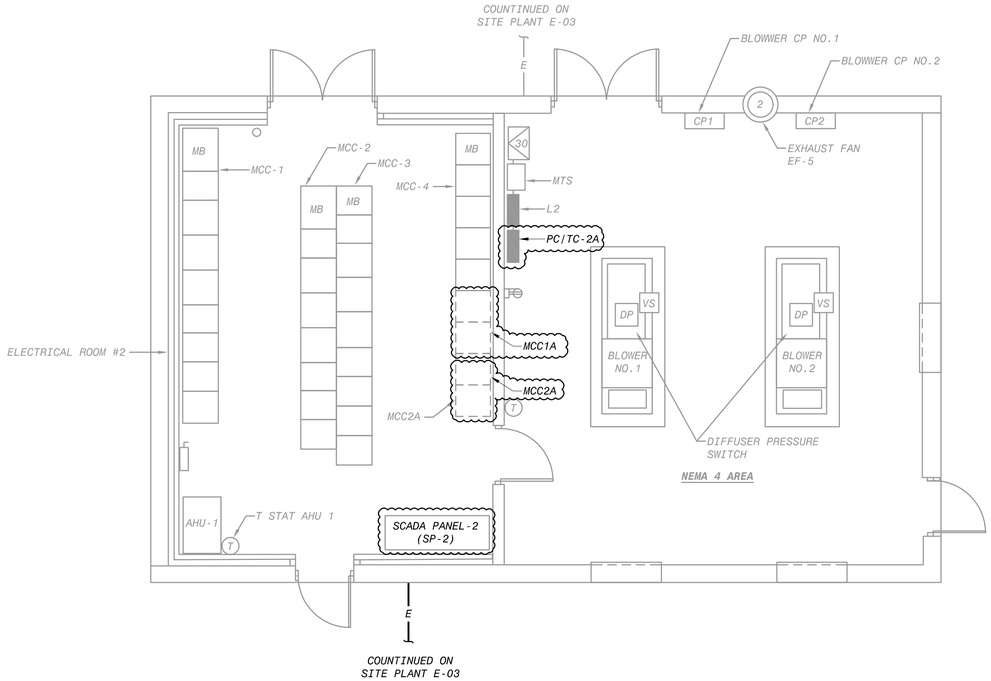
DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

E-13
SHEET
25 OF 35

FD7000
198898



ELECTRICAL BUILDING NO.2 POWER PLAN
NTS

NOTES:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL NOTES.
2. MCC'S IN MCC BUILDING #2 WILL BE USED FOR POWERING NEW EQUIPMENT, INCLUDING SCUM PUMPS, ELECTRIC GATE ACTUATORS, AND MISCELLANEOUS LIGHTING.

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE
C	AD	RE	MT	DEC 2019	100% SUBMITTAL
B	AD	RDT	MT	NOV 2018	90% SUBMITTAL
A	AD	MM	RDT	SEPT 2018	60% SUBMITTAL

50.3060 - Electrical Diagrams Drawings
E-14.dwg
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PLOTTED:
USER: GAMT8713
DWG VER: 1003
XREF1:
XREF2:
XREF3:
XREF4:

RICHARD D. TAYLOR LICENSED No 33376 STATE OF FLORIDA PROFESSIONAL ENGINEER

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Tampa, Florida
Certificate No. 8132

MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
ELECTRICAL BUILDING NO.2 POWER PLAN

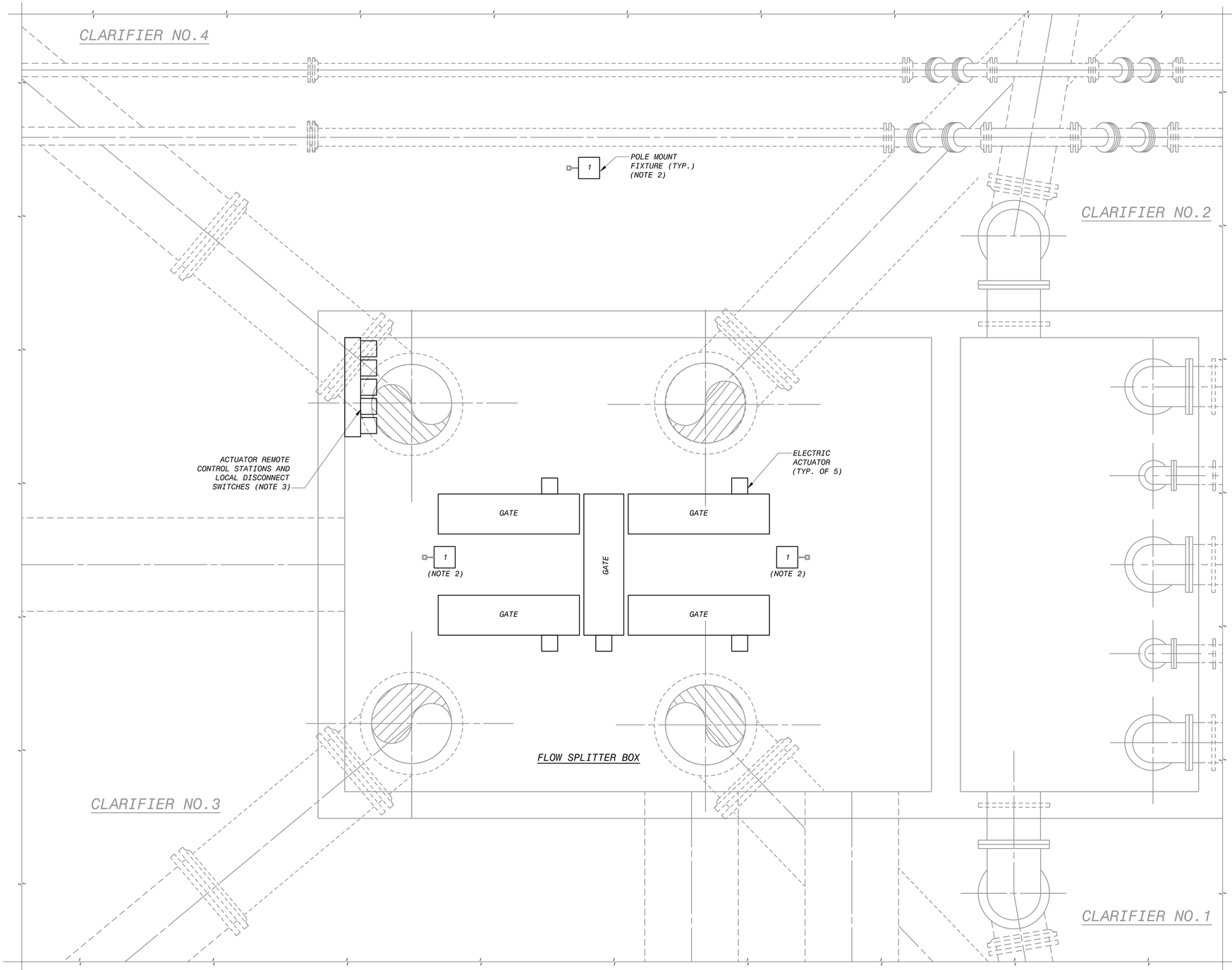
DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

E-14
SHEET
26 OF 35

FD7000
198898



NOTES:

1. SEE DRAWING E-01 AND E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL NOTES.
2. CONTRACTOR SHALL FIELD VERIFY LOCATION OF EXISTING LIGHTING POLES AND REPLACE EXISTING HPS FIXTURE WITH LED FIXTURE TYPE 1 REFERENCED ON E-04 LIGHTING SCHEDULE. REPLACEMENT LED FIXTURE TO BE MOUNTED ON EXISTING POLE.
3. GATE ACTUATOR LOCAL DISCONNECT SWITCHES SHALL BE MOUNTED BELOW THE ACTUATOR REMOTE CONTROL STATION.

SPLITTER BOX GATES POWER AND LIGHTING PLAN

1/2"=1'-0"

12" 6" 0 1' 2' 3' 4' 5'

1/2"=1'-0"

NO.	BY	CK	APP
C	AD	RE	MT
B	AD	RDT	MT
A	AD	MM	RDT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50.3060 - Electrical Diagrams Drawings

E-15.dwg

SAVED: GAWT8713, 2/12/2019 3:58:28 PM

PLOTTED:

USER: GAWT8713

XREF1:
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DWG VER: 11004

RICHARD D. TAYLOR LICENSED No 33376 STATE OF FLORIDA PROFESSIONAL ENGINEER

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
SPLITTER BOX GATES-POWER AND LIGHTING PLAN

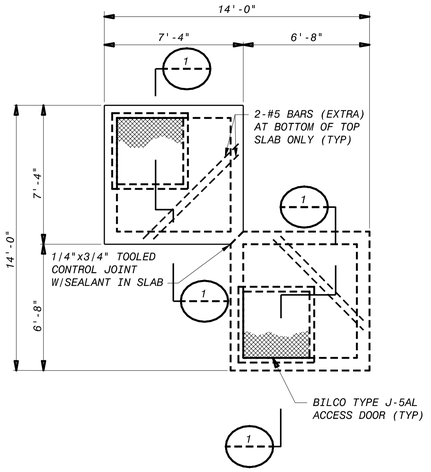
DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

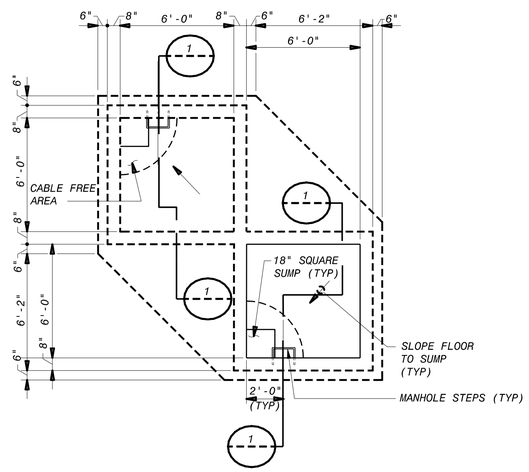
PROJECT NO.
198898

E-15
SHEET
27 OF 35

FD7000
198898



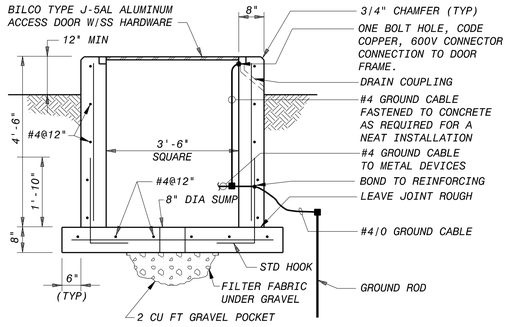
PLAN



SECTIONAL PLAN

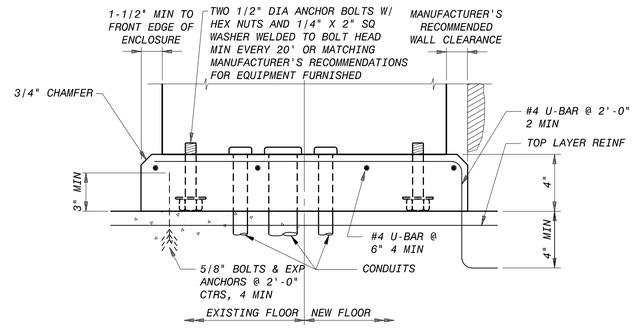
ELECTRICAL MANHOLE (DOUBLE CHAMBER)

NO SCALE NOT SUITABLE FOR ROADWAY LOCATIONS



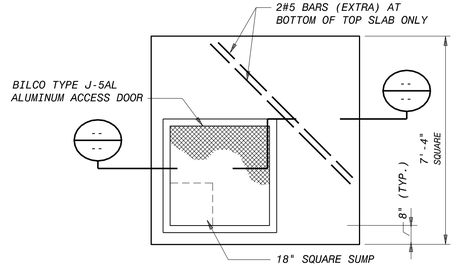
TYPICAL ELECTRICAL HANDHOLE DETAIL

NO SCALE NOT SUITABLE FOR ROADWAY LOCATIONS



ELECTRICAL EQUIPMENT BASE

NO SCALE



TYPICAL ELECTRICAL MANHOLE (SINGLE CHAMBER)

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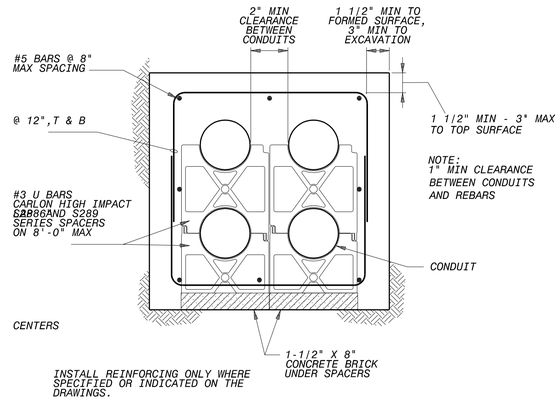
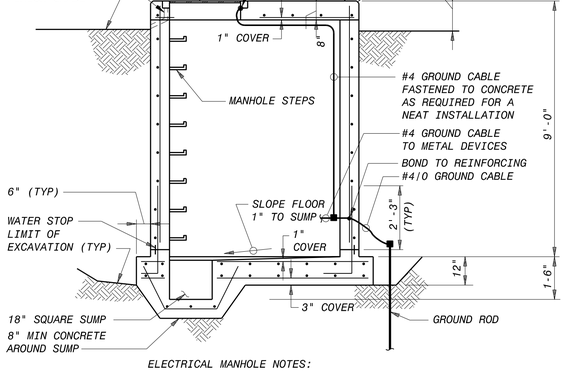


INSTALL REINFORCING ONLY WHERE SPECIFIED OR INDICATED ON THE DRAWINGS.

TYPICAL DUCT BANK SECTION

NO SCALE

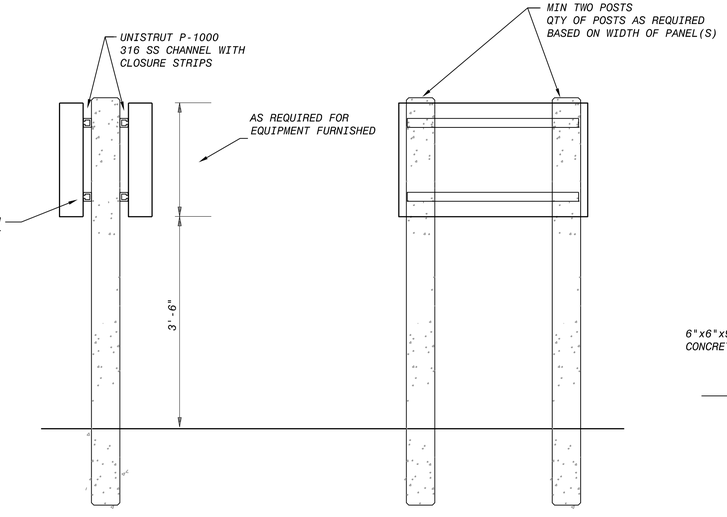


ELECTRICAL MANHOLE NOTES:

1. CABLE AND CONDUIT SUPPORTS SHALL BE SPACED AT 2'-0" HORIZONTAL CENTERS IN WALLS AND SHALL BEGIN 2'-0" FROM FLOOR.
2. SUPPORTS IN CEILINGS SHALL RUN FROM WALL TO WALL.
3. OPENING SHALL BE PROVIDED IN MANHOLE WALLS FOR CONDUIT BANK ENTRANCE AS REQUIRED.
4. ALL REINFORCING ON THIS DETAIL SHALL BE #5@12" UNLESS NOTED OTHERWISE. CENTER VERTICAL REINFORCING IN THE WALLS.
5. CONCRETE TO BE ROUGH AND CLEAN AT CONSTRUCTION JOINT FACES.

ELECTRICAL MANHOLE SECTION

NO SCALE NOT SUITABLE FOR ROADWAY LOCATIONS

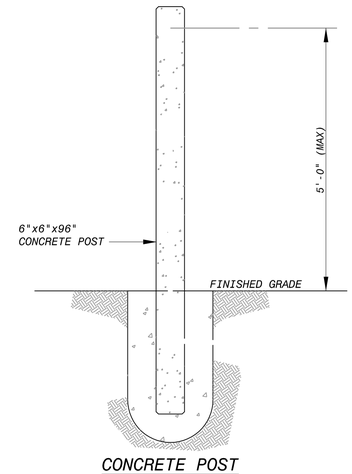


NOTES:

1. ALL INSTRUMENT MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL.
2. POSITION PANEL BOXES SO OPERATOR'S BACK IS NOT TO WET WELL WHILE FACING BOX
3. PANEL BOXES TO BE LOCATED TO ALLOW UNOBSTRUCTED ACCESS TO WET WELL

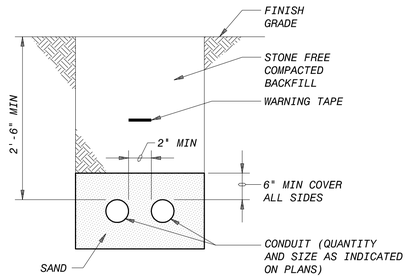
TYPICAL EQUIPMENT MOUNTING DETAIL

NO SCALE



CONCRETE POST FRONT ELEVATION - DETAIL

NO SCALE



TYPICAL DIRECT BURIED CONDUIT SECTION

NO SCALE

NOTES:

1. SEE DRAWING E-0001 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

C	AD	RE	MT	
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A	AD	MM	RDT	
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50.3060 - Electrical Diagrams Drawings

E-16.dwg

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PLOTTED:

USER: GAM78713

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XREF1:

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DAVID D. TAYLOR
REGISTERED PROFESSIONAL ENGINEER
No 33376
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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS PUMP STATION

ELECTRICAL
TYPICAL DETAILS

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1

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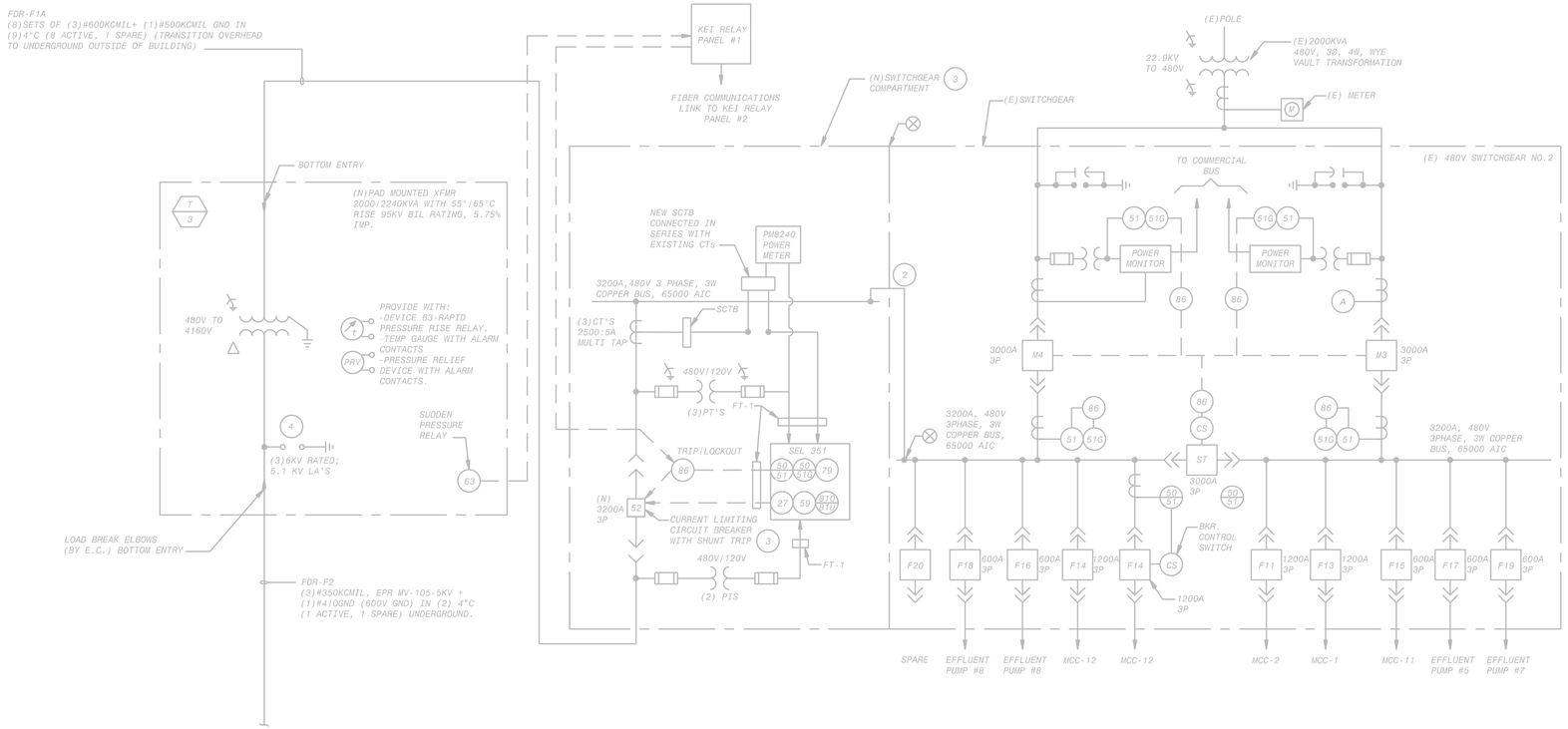
PROJECT NO.
198898

E-16
SHEET
28 OF 35

FD7000
198898



POWER METER CONNECTION TO CoGEN SYSTEM (EXISTING)
NTS

NOTE:

1. CONNECTION TO PM8240 POWER METER SHAIRING SEL-351 CT'S AND PT'S.

NO.	BY	CK	APP
A	AD	RE	MT

FEB 2019 100% SUBMITTAL
DATE REVISIONS AND RECORD OF ISSUE

50.3060 - Electrical Diagrams Drawings
E-17.dwg

XREF1:
SAVED:ACH95836, 2/21/2019 2:36:58 PM
XREF2:
PLOTTED:ACH95836, 2/20/2019 5:28:27 PM
XREF3:
USER:ACH95836 DWG VER:1003
XREF4:

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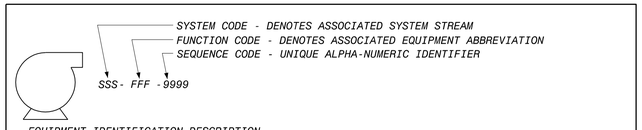
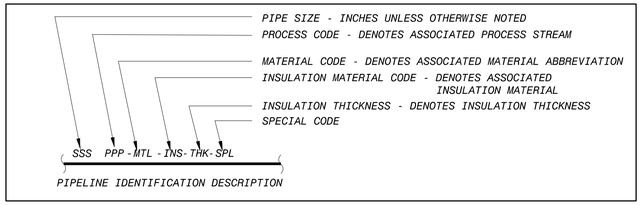
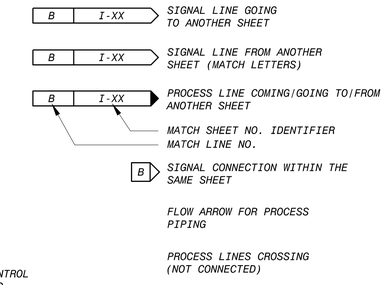




LINE SYMBOLS

- MAJOR PROCESS PIPING OR FLOW CHANNEL
- SECONDARY PROCESS PIPING
- MISCELLANEOUS PIPING
- SCREENED LINE DENOTES EXISTING PIPE OR EQUIPMENT
- DASHED LINE DENOTES FUTURE PIPE AND EQUIPMENT
- ELECTRIC SIGNAL
- HYDRAULIC SIGNAL
- PNEUMATIC SIGNAL
- SIGNAL CONNECTION POINT
- CONTROL SYSTEM BACKBONE NETWORK SIGNAL (ETHERNET)
- FIELD DEVICE NETWORK SIGNAL (ETHERNET)
- NON-STANDARD OR INDEPENDENT CONTROL SYSTEM NETWORK SIGNAL (AS NOTED ON DRAWINGS)



MECHANICAL EQUIPMENT SYMBOLS


VAPORIZER: AMBIENT


PARTICULATE FILTER


ROTARY SCROLL COMPRESSOR


AIR FILTER


WATER FILTER: CARTRIDGE TYPE


WATER FILTER: MEMBRANE TYPE


MIXER


COMPRESSOR


VALVE: MATERIAL HANDLING ROTARY


AIR REGULATOR

STATIC MIXER


HEAT EXCHANGER: TYPE 1


HEAT EXCHANGER: TYPE 2


HEAT EXCHANGER: FINNED TUBE


HEAT EXCHANGER: SHELL & TUBE


HEAT EXCHANGER: PLATE & FRAME


HEAT EXCHANGER: SPIRAL


HEAT EXCHANGER: DOUBLE PIPE


HEAT EXCHANGER: AIR


BOILER

AFTERCOOLER


FILTER SEPARATOR


SILENCER


HYDROCYCLONE

PUMP & BLOWER SYMBOLS


CENTRIFUGAL PUMP OR OTHER TYPE NOT SPECIFIED


SUBMERGED CENTRIFUGAL PUMP


SCREW (LIFT) PUMP


ROTARY PUMP


PROGRESSING CAVITY PUMP


POSITIVE DISPLACEMENT PUMP


PLUNGER PUMP

VERTICAL PUMP


SUMP PUMP


CENTRIFUGAL FAN


CENTRIFUGAL BLOWER


POSITIVE DISPLACEMENT BLOWER


COMPRESSOR: RECIPROCATING

COMPRESSOR: ROTARY SCREW

COMPRESSOR: LIQUID RING

MOTOR DRIVEN DIAPHRAGM METERING PUMP

SOLENOID PUMP

PERISTALTIC PUMP

DRUM PUMP

DOUBLE DIAPHRAGM PUMP

ELECTRIC MOTOR

WATER & WASTEWATER SYMBOLS

OZONE GENERATOR WITH POWER SUPPLY

OZONE GENERATOR

GRIT CONCENTRATOR & DEWATERING SCREW

BAR SCREEN: MECHANICAL

GRIT COLLECTOR: VORTEX TYPE

RECTANGULAR BASIN

SOLIDS COLLECTOR

SOLIDS COLLECTOR W/SETTLING PLATES

RECTANGULAR SEDIMENTATION BASIN

UV HORIZONTAL BULBS

MANUAL BAR SCREEN

GAS FLARE

GRIT CLASSIFIER

GRAVITY FILTER

GRAVITY THICKENER

CIRCULAR SEDIMENTATION BASIN

DAF

BELT FILTER PRESS

GRAVITY BELT THICKENER

CENTRIFUGE

RECTANGULAR SEDIMENTATION BASIN WITH SETTLING PLATES

GRIT BASIN

SLUDGE GRINDER: INLINE

SLUDGE GRINDER: CHANNEL MOUNTED

GRIT CONCENTRATOR

MATERIAL HANDLING EQUIPMENT SYMBOLS

CYCLONE SEPARATER

DUMPSTER

BIN: LIVE BOTTOM

BIN: SLIDING FRAME

SCREEN: SINGLE VIBRATORY

SCREEN: DOUBLE VIBRATORY

GRINDER

BIN - CLOSED TOP

BIN - OPEN TOP

HORIZONTAL BAR SCREEN

MIXER: PUGMILL

MIXER: BLENDER

CONVEYOR: BELT

CONVEYOR: VIBRATORY

PISTON CAKE PUMP: SINGLE

PISTON CAKE PUMP: DOUBLE

CONVEYOR: SCREW

HOPPER

DUST HOPPER

PRIMARY ELEMENT & FITTING SYMBOLS

- DIAPHRAGM SEAL
- PRIMARY FLOW ELEMENT: ORIFICE PLATE
- PRIMARY FLOW ELEMENT: FLUME
- PRIMARY FLOW ELEMENT: TURBINE OR PROPELLER-TYPE
- PRIMARY FLOW ELEMENT: ELECTROMAGNETIC
- THERMAL DISPERSION OR THERMAL MASS TYPE FLOW ELEMENT
- PRIMARY FLOW ELEMENT: TRANSIT-TIME ULTRASONIC
- FLOW CONDITIONER
- LE / CON — CONDUCTANCE TYPE LEVEL SENSOR
- LE / RAD — RADAR TYPE LEVEL SENSOR
- LE / GWR — GUIDED WAVE RADAR TYPE LEVEL SENSOR
- ANNULAR TYPE DIAPHRAGM SEAL
- PRIMARY FLOW ELEMENT: POSITIVE DISPLACEMENT
- PRIMARY FLOW ELEMENT: VENTURI TUBE, FLOW NOZZLE, OR FLOW TUBE. * SEE MEASUREMENT SYMBOL NOTATIONS LIST
- PRIMARY FLOW ELEMENT: WEIR
- PRIMARY FLOW ELEMENT: PITOT TUBE
- PRIMARY FLOW ELEMENT: CORIOLIS
- HORN OR SIREN
- FG — ROTAMETER
- LE / US — ULTRASONIC TYPE LEVEL SENSOR
- LE / DP — PRESSURE SENSING LEVEL SENSOR
- PILOT LIGHT
- REDUCER - CONCENTRIC
- REDUCER - ECCENTRIC
- FLANGE
- D — DRAIN - BELL-UP
- D — DRAIN - FUNNEL
- FLEXIBLE CONNECTION
- CAP
- PLUG
- T — TRAP
- FLAME CHECK
- SURGE CHAMBER
- FLAME ARRESTER
- SEDIMENT TRAP
- P — INSTRUMENT PURGE OR FLUSHING DEVICE
- UNION
- HOSE CONNECTION
- STRAINER - Y TYPE
- STRAINER - BASKET
- Q — QUICK CONNECT
- VENT
- VENT - SCREENED
- COUPLING
- LG — SIGHTGLASS
- MOISTURE SEPARATOR
- EXPANSION LOOP
- SUCTION DIFFUSER

CHEMICAL FEED EQUIPMENT SYMBOLS

- DIFFUSER: TANK
- DIFFUSER: CHANNEL
- INJECTOR
- RUPTURE DISK
- PULSATION DAMPNER
- CHLORINE CYLINDER
- VAPOR SUPERHEATER
- PRESSURE BUILDING COIL
- SPECTACLE, BLIND, CLOSED
- SPECTACLE, BLIND, OPEN
- CALIBRATION COLUMN
- EXPANSION TANK OR FUNNEL
- WEIGH SCALE
- DRIP LEG HEATER
- TOTE
- AS — AUTOMATIC SWITCHOVER
- PASTE TYPE LIME SLAKER
- EDUCTOR
- GAS FEEDER
- EVAPORATOR
- DRY CHEMICAL FEEDER
- TON CONTAINER
- POLYMER BLENDER FEEDER
- POLYMER BLENDER FEEDER
- POLYMER INJECTION RING
- DIFFUSER
- DIFFUSER - PLAN
- CO2 VAPORIZOR
- COMBINATION SHOWER/ EYEWASH FOUNTAIN
- EYEWASH FOUNTAIN
- SHOWER

VALVE & GATE SYMBOLS

- GATE: SLUICE OR SLIDE
- VALVE: GATE OR OTHER TWO-WAY TYPE NOT OTHERWISE IDENTIFIED
- VALVE: BALL
- VALVE: GLOBE
- VALVE: BUTTERFLY
- VALVE: ECCENTRIC PLUG
- VALVE: NON-ECCENTRIC PLUG
- VALVE: THREE WAY
- VALVE: FOUR WAY
- VALVE: CHECK
- VALVE: DIAPHRAGM
- VALVE: VPORT BALL
- VALVE: MUD
- VALVE: THERMAL SHUTOFF
- VALVE: NEEDLE
- VALVE: SLEEVE
- GATE: FLAP
- VALVE: VENTED BALL
- VALVE: DIVERTER
- VALVE: PRESSURE REDUCING
- VALVE: PRESSURE SUSTAINING
- VALVE: PRESSURE REDUCING (SELF ACTUATING TYPE)
- VALVE: PRESSURE SUSTAINING (SELF ACTUATING TYPE)
- P — VALVE: PILOT ACTUATED RELIEF
- VALVE: VACUUM RELIEF
- VALVE: PRESSURE RELIEF
- VALVE: PRESSURE/VACUUM RELIEF
- VALVE: ANGLE
- VALVE: SET STOP
- VALVE: PINCH
- VALVE: STOP CHECK
- VALVE: TELESCOPING
- VALVE: COMBINATION AIR
- VALVE: AIR RELEASE
- VALVE: AIR VACUUM
- VALVE: CHLORINE WITH YOKE
- M — CHLORINE VACUUM REGULATOR
- VALVE: KNIFE GATE
- BACKFLOW PREVENTER
- VACUUM BREAKER
- EXPLOSION RELIEFF
- VALVE: GENERIC ROTARY

VALVE AND GATE ACTUATOR SYMBOLS

- HANDWHEEL ACTUATOR
- S — SOLENOID
- S / R — SOLENOID - MANUAL RESET
- S / R / R — SOLENOID - REMOTE RESET
- PRESSURE BALANCED DIAPHRAGM
- M — INTELLIGENT ELECTRIC
- M / SM — SMALL MOTOR ACTUATOR
- I/P — CURRENT - TO-PNEUMATIC ACTUATOR
- E/H — ELECTRIC-HYDRAULIC
- SPRING-DIAPHRAGM ACTUATOR OR OTHERWISE UNSPECIFIED
- P — PNEUMATIC ACTUATOR
- P / DA — PNEUMATIC ACTUATOR DOUBLE ACTING
- P / SC — PNEUMATIC ACTUATOR SPRING CLOSE
- P / SO — PNEUMATIC ACTUATOR SPRING OPEN
- FLOAT OPERATED VALVE
- SPRING OR WEIGHT ACTUATED RELIEF OR SAFETY VALVE ACTUATOR LOADED VALVE
- QUICK OPENING VALVE
- QUICK CLOSING VALVE
- LOADING/BACK PRESSURE VALVE

GENERAL NOTES

1. IN GENERAL, THE P&ID SYMBOLS AND DEVICE IDENTIFICATIONS ARE BASED ON INTERNATIONAL SOCIETY OF AUTOMATION, STANDARD PRACTICE ANSI/ISA-5.1 (2009). SOME MODIFICATIONS, ADDITIONS, AND ALTERATIONS HAVE BEEN MADE AS NEEDED TO ACCOMMODATE THE PROJECT REQUIREMENTS.
2. SOME CONTROL AND INTERLOCK REQUIREMENTS WHICH CAN BE MORE CLEARLY ILLUSTRATED ON SCHEMATIC DRAWINGS HAVE BEEN OMITTED FROM THE P&ID DRAWINGS.
3. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
4. PIPING AND EQUIPMENT LEGEND APPLIES TO P&ID SHEETS ONLY AND MAY DIFFER FROM LEGENDS FOR OTHER SHEETS.

NO.	BY	CK	APP
D	AD	RDT	MT
C	AD	RDT	MT
B	AD	UB	RDT
A	AD	UB	RDT

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50.3040 - General Drawings
I-01.dwg
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DONALD D. TAYLOR — No 33376 — STATE OF FLORIDA — PROFESSIONAL ENGINEER

MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

INSTRUMENTATION
LEGEND & ABBREVIATIONS
SHEET 1 OF 3

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

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IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

I-01
SHEET
30 OF 35

FD7000
198898

INSTRUMENT AND I/O ABBREVIATIONS
MEANINGS OF IDENTIFICATION LETTERS

LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	VARIABLE MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT OR ACTIVE FUNCTION	FUNCTION MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	CLOSE
D	USER'S CHOICE	DIFFERENTIAL			DEVIATION
E	VOLTAGE (EMF)		SENSOR, PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, GAUGE, VIEWING DEVICE		
H	HAND (MANUALLY INITIATED)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER		SCAN		
K	TIME OR TIME-SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE OR INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE (RESTRICTION)		OPEN
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE OR TOTALIZE	INTEGRATE OR TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED OR FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
V	VIBRATION OR MECHANICAL ANALYSIS			VALVE, DAMPER OR LOUVER	
W	WEIGHT OR FORCE		WELL, PROBE		
X	UNCLASSIFIED	X-AXIS	ACCESSORY DEVICES OR UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE, OR PRESENCE	Y-AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z-AXIS		DRIVE, ACTUATOR OR FINAL CTRL ELEMENT	

GENERAL NOTES

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PIPELINE MATERIAL CODE ABBREVIATIONS

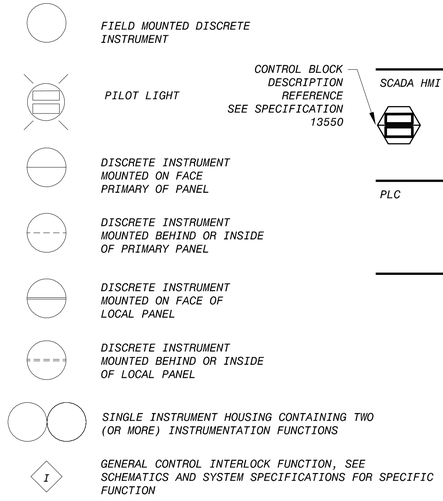
PCCP	SECTION 40 05 39.14, PRESTRESSED CONCRETE CYLINDER PIPE
CBWS	SECTION 40 05 39.16, CONCRETE BAR-WRAPPED, STEEL CYLINDER PIPE
RCP	SECTION 40 05 39.24, CONCRETE PIPE
PVC	SECTION 40 05 31.12, POLYVINYL CHLORIDE PIPE
DIP	SECTION 40 05 19, DUCTILE IRON PIPE
SP	SECTION 40 05 24, STEEL PIPE
SS-XX1	SECTION 40 05 23, STAINLESS STEEL PIPE, TUBING, AND ACCESSORIES
CSG-XX	SECTION 40 05 24.43, MISC. STEEL PIPE, TUBING, AND ACCESSORIES
CS-XX	SECTION 40 05 24.43, MISC. STEEL PIPE, TUBING, AND ACCESSORIES
FRPE-XX	SECTION 40 05 36.11, FIBERGLASS REINFORCED PLASTIC PIPE (EXHAUST AIR SERVICE)
FRP-XX	SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
PVC-XX	SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
CPVC-XX	SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
PE-XX	SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
PP-XX	SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
PVDF-XX	SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
RPT-XX	SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
CI-XX	SECTION 22 13 17, CAST IRON SOIL PIPE AND ACCESSORIES
CU-XX	SECTION 40 05 17, COPPER TUBING AND ACCESSORIES
BR-XX	SECTION 40 05 41, MISCELLANEOUS PIPING AND PIPE ASSEMBLY
HS-XX	SECTION 40 05 41, MISCELLANEOUS PIPING AND PIPE ASSEMBLY
TG-XX	SECTION 40 05 41, MISCELLANEOUS PIPING AND PIPE ASSEMBLY
CRP-XX	SECTION 40 05 41, MISCELLANEOUS PIPING AND PIPE ASSEMBLY

1. XX= numbers 01-20

INSTRUMENT AND I/O ABBREVIATION DEFINITIONS

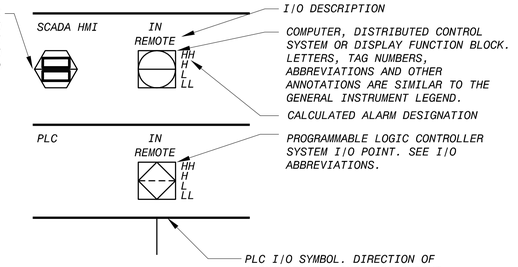
AAH	ANALYZER ALARM HIGH
AAHH	ANALYZER ALARM HIGH-HIGH
AAL	ANALYZER ALARM LOW
AALL	ANALYZER ALARM LOW-LOW
AAX	ALARM HORN
AAL	STROBE ALARM LIGHT
AE	ANALYZER SENSOR
AI	ANALYZER INDICATION
AIT	ANALYZER INDICATING TRANSMITTER
ASH	ANALYZER SWITCH HIGH
ASHH	ANALYZER SWITCH HIGH-HIGH
CB	CONTROL BLOCK REFERENCE (SCADA LEVEL)
FAL	FLOW ALARM LOW
FAH	FLOW ALARM HIGH
FC	FLOW CONTROLLER
FI	FLOW DIGITAL INDICATOR (LED OR SCREEN)
FIC	FLOW INDICATING CONTROLLER
FE	PRIMARY FLOW ELEMENT/SENSOR
FG	FLOW SIGHT GAUGE
FIT	FLOW INDICATING TRANSMITTER
FQG	FLOW TOTALIZING GAUGE
FQIT	FLOW TOTALIZING INDICATING TRANSMITTER
FSH	FLOW SWITCH HIGH
FSL	FLOW SWITCH LOW
FY	FLOW SIGNAL CONVERTER, REPEATER, OR ISOLATOR
HIC	HAND INDICATING CONTROLLER
HMS	MOMENTARY PUSHBUTTON OR SELECTOR SWITCH
HS	HAND SWITCH
IE	CURRENT ELEMENT/SENSOR
IAH	CURRENT ALARM HIGH (MOTOR OVERLOAD)
ISH	CURRENT SWITCH HIGH USED TO DETECT HIGH TORQUE)
JA	POWER FAILURE ALARM
JI	POWER INDICATOR
JL	POWER INDICATING LIGHT
JIT	POWER INDICATING TRANSMITTER
KQI	TIME TOTALIZING INDICATOR
LAL	LEVEL ALARM LOW
LALL	LEVEL ALARM LOW-LOW
LAH	LEVEL ALARM HIGH
LAHH	LEVEL ALARM HIGH-HIGH
LE	PRIMARY LEVEL ELEMENT/SENSOR
LG	LEVEL SIGHT GAUGE
LI	LEVEL INDICATOR (LED OR SCREEN)
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW LOW
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH-HIGH
LY	LEVEL SIGNAL CONVERTER, ISOLATOR, OR REPEATER
PAL	PRESSURE ALARM LOW
PALL	PRESSURE ALARM LOW-LOW
PAH	PRESSURE ALARM HIGH
PAHH	PRESSURE ALARM HIGH-HIGH
PDG	DIFFERENTIAL PRESSURE GAUGE
PDI	DIFFERENTIAL PRESSURE INDICATOR (LED OR SCREEN)
PDIT	DIFFERENTIAL PRESSURE INDICATING TRANSMITTER
PDAH	DIFFERENTIAL PRESSURE ALARM HIGH
PDAHH	DIFFERENTIAL PRESSURE ALARM HIGH-HIGH
PDSH	DIFFERENTIAL PRESSURE SWITCH HIGH
PDSHH	DIFFERENTIAL PRESSURE SWITCH HIGH-HIGH
	DIFFERENTIAL PRESSURE SWITCH LOW
PDSL	DIFFERENTIAL PRESSURE SWITCH LOW-LOW
PDSLL	PRESSURE SENSOR
PE	PRESSURE GAUGE
PG	PRESSURE INDICATOR (LED OR SCREEN)
PI	PRESSURE INDICATING TRANSMITTER
PIT	PRESSURE SWITCH LOW
PSL	PRESSURE SWITCH HIGH
PSH	SPEED INDICATION (LED OR SCREEN)
SI	SPEED CONTROL
SC	SPEED INDICATING TRANSMITTER
SIT	SPEED SWITCH LOW
SSL	SPEED INDICATING TRANSMITTER
SIT	TEMPERATURE ALARM HIGH
TAH	TEMPERATURE ALARM HIGH-HIGH
TAHH	TEMPERATURE ALARM LOW
TAL	DIFFERENTIAL TEMPERATURE INDICATOR (LED OR SCREEN)
TDI	DIFFERENTIAL TEMPERATURE TRANSMITTER
TDIT	TEMPERATURE SENSOR/RESISTANCE
TE	TEMPERATURE DETECTOR
	TEMPERATURE SWITCH HIGH
TSH	TEMPERATURE SWITCH HIGH HIGH
TSHH	TEMPERATURE SWITCH LOW
TSL	TEMPERATURE GAUGE
TG	TEMPERATURE INDICATOR (LED OR SCREEN)
TI	TEMPERATURE INDICATING TRANSMITTER
TIT	MULTIVARIABLE/COMMON ALARM/COMMON
UA	FAULT
	RUN COMMAND
UCR	STOP COMMAND
UCS	VIBRATION ALARM HIGH
VAH	TORQUE ALARM HIGH
WAH	TORQUE ALARM HIGH HIGH
WAHH	TORQUE SWITCH HIGH
WSH	TORQUE SWITCH HIGH-HIGH
WSHH	PRIMARY WEIGHT SENSOR/LOAD CELL
WE	WEIGHT GAUGE
WG	WEIGHT INDICATING TRANSMITTER
WIT	GENERAL ALARM EVENT
YA	EVENT INDICATION (LED OR SCREEN)
YI	RUNNING INDICATION
YIR	STOPPED INDICATION
YIS	EVENT INDICATING LIGHT
YL	RUNNING INDICATING LIGHT
YLR	STOPPED INDICATING LIGHT
YLS	POSITION INDICATOR
ZI	CLOSED INDICATION
ZIC	OPEN INDICATION
ZIO	CLOSED INDICATING LIGHT
ZLC	OPEN INDICATING LIGHT
ZLO	CLOSED POSITION SWITCH
ZSC	OPEN POSITION SWITCH
ZSO	POSITION INDICATING TRANSMITTER
ZIT	POSITION TRANSMITTER
ZT	

GENERAL INSTRUMENT SYMBOLS



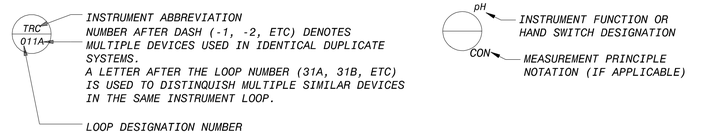
DIGITAL SYSTEMS INTERFACE SYMBOLS

NOTE: REFER TO DETAILED SYSTEM SPECIFICATIONS FOR FUNCTIONAL DESCRIPTION. ALSO SEE I/O SCHEDULES FOR COMPLETE INPUT AND OUTPUT LISTINGS.



- △ DISCRETE INPUT
- ▽ DISCRETE OUTPUT
- ▲ ANALOG INPUT
- ▼ ANALOG OUTPUT
- △ PULSE INPUT

INSTRUMENTATION SYMBOLOGY AND DESIGNATIONS



FUNCTION DESIGNATIONS AND ABBREVIATIONS

MEASUREMENT PRINCIPLE NOTATIONS

CON	CONDUCTANCE
DP	DIFFERENTIAL PRESSURE SENSING
FLN	FLOW NOZZLE
FLT	FLOW TUBE
GWR	GUIDED WAVE RADAR
RAD	RADAR
US	ULTRASONIC
VENT	VENTURI TUBE

CALCULATED ALARM DESIGNATIONS

L	LOW
LL	LOW-LOW
H	HIGH
HH	HIGH-HIGH

INDICATING LIGHT/ALARM DESIGNATIONS

OVRLD	OVERLOAD
TRQ HI	TORQUE HIGH
TRQ HI-HI	TORQUE HIGH-HIGH

INSTRUMENT FUNCTIONS

K	GAIN OR ATTENUATE (INPUT:OUTPUT)
-K	GAIN AND REVERSE
Σ	ADD OR SUM (ADD AND SUBTRACT)
Δ	SUBTRACT (DIFFERENCE)
√‾	EXTRACT SQUARE ROOT
÷	DIVIDE
F(X)	CHARACTERIZE SIGNAL
>	HIGH-SELECT
<	LOW-SELECT
×	MULTIPLY
∫	INTEGRATE (TIME INTEGRAL)
CH4	METHANE
CL2	CHLORINE RESIDUAL
CO2	CARBON DIOXIDE
DO	DISSOLVED OXYGEN
FL	FLUORIDE
H2S	HYDROGEN SULFIDE
LEL	LOWER EXPLOSIVE LIMIT
MCC	MOTOR CONTROL CENTER
MLSS	MIXED LIQUOR SUSPENDED SOLIDS
02	OXYGEN (PURITY)
03	OZONE
PCN	PARTICLE COUNTER
pH	pH
SCD	STREAMING CURRENT DETECTOR
TURB	TURBIDITY
HI RNG TURB	HIGH RANGE TURBIDITY

HAND SWITCH DESIGNATIONS

FR	FORWARD-REVERSE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
LOA	LOCAL-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LR	LOCAL REMOTE
OCA	OPEN-CLOSE-AUTO
OOA	ON-OFF-AUTO
OC	OPEN-CLOSE
OO	ON-OFF
OOR	ON-OFF-REMOTE
OSC	OPEN-STOP-CLOSE
OO/R	ON-OFF/RESET

TRANSDUCER & CONVERTER DESIGNATION

E	VOLTAGE
FSK	FREQUENCY SHIFT KEYING
H	HYDRAULIC
I	CURRENT
P	PNEUMATIC PULSE
PD	PULSE DURATION
PF	PULSE FREQUENCY
R	RESISTANCE (ELECTRICAL)

EXAMPLE: I/P = CURRENT TO PNEUMATIC TRANSDUCER

POWER SUPPLY ABBREVIATIONS

AS	AIR SUPPLY
ES	ELECTRIC SUPPLY
GS	GAS SUPPLY
HS	HYDRAULIC SUPPLY
NS	NITROGEN SUPPLY
SS	STEAM SUPPLY
WS	WATER SUPPLY
120V	120VAC

120V — POWER SUPPLY SOURCE LABEL. USED ONLY WHERE NECESSARY TO HELP CLARIFY AN INSTRUMENT OR SYSTEM FUNCTION.

NO.	BY	CK	APP
D	AD	RDT	MT
C	AD	RDT	MT
B	AD	UB	RDT
A	AD	UB	RDT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL
JULY 2018	30% SUBMITTAL

50.3040 - General Drawings
I-02.dwg

XREF1:
XREF2:
XREF3:
XREF4:

SAVED: GWF7B713, 2/12/2019 2:33:17 PM
PLOTTED: GLA36511, 5/18/2018 4:27:39 PM
USER: GWF7B713 DWG VER: 1000

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

INSTRUMENTATION
LEGEND & ABBREVIATIONS
SHEET 2 OF 3

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

I-02
SHEET
31 OF 35

FD7000 198898

SYSTEM CODE ABBREVIATIONS

ACE	ACETIC ACID
ACT	ACETYLENE
GAC	ACTIVATED CARBON - GRANULAR
AIR	AERATION AIR/PROCESS AIR
AER	AERATION SYSTEM
AW	AIR WASH
ALS	ALUMINUM SULFATE
NSO4	AMMONIUM SULFATE
NH3	ANHYDROUS AMMONIA
AS	ANTI-SEALANT
NHOH	AQUA AMMONIA
ARG	ARGON
ASH	ASH
BWH	BACKWASH - MEMBRANE/FILTER
BAL	BALLASTED FLOCCULATION
BIO	BIOSOLIDS
BIT	BIOTOWER
BLS	BLENDED SLUDGE
BNR	BNR
BRN	BRINE
CACL	CALCIUM HYPOCHLORITE
CATS	CALCIUM THIOSULFATE
CO2	CARBON DIOXIDE
CAS	CARBON SLURRY
HCO3	CARBONIC ACID
CEN	CENTRATE
CEB	CHEMICAL ENHANCED BACKWASH - MEMBRANE
CL2	CHLORINE
CLO2	CHLORINE DIOXIDE
CA	CITRIC ACID
CIP	CLEAN IN PLACE
COA	COAGULATION
CAI	COMPRESSED AIR - INSTRUMENT
CMS	COMPRESSED AIR - SERVICE
CUS	COPPER SULFATE
CI	CORROSION INHIBITOR
DCL	DECHLORINATION
DET	DETERGENT
DWT	DEWATERING
FUE	DIESEL FUEL
DGG	DIGESTER GAS
DGM	DIGESTER GAS MIXING
DGS	DIGESTER SLUDGE
DGA	DIGESTION - AEROBIC
DIG	DIGESTION - ANAEROBIC
DCB	DISINFECTION CONTACT BASIN
DAF	DISSOLVED AIR FLOTATION
DRN	DRAINAGE
EFP	EFFLUENT PUMPING
EXH	ENGINE EXHAUST
EQB	EQUALIZATION BASIN
FEC	FERRIC CHLORIDE
FES	FERRIC SULFATE
FRC	FERROUS CHLORIDE
FRS	FERROUS SULFATE
FLT	FILTRATION
FLC	FLOCCULATION
GOX	GASEOUS OXYGEN
GSL	GASOLINE
GRS	GREASE
GRT	GRIT
HEL	HELIUM
HFL	HYDRAULIC FLUID
HCL	HYDROCHLORIC ACID
HFS	HYDROFLUOSILIC ACID (FLUORIDE)
HYD	HYDROGEN
PER	HYDROGEN PEROXIDE
INC	INCINERATION
INFP	INFLUENT PUMPING
INT	INTAKE
LAG	LAGOON STORAGE
LAP	LAND APPLICATION
CAH	LIME - HYDRATED
CAO	LIME - QUICKLIME
LIM	LIME STABILIZATION
LOX	LIQUID OXYGEN
LPG	LP GAS OR PROPANE GAS
MGOH	MAGNESIUM HYDROXIDE
MEM	MEMBRANE
MEG	METHANE GAS
MTH	METHANOL
MXL	MIXED LIQUOR
NG	NATURAL GAS
NIT	NITROGEN
NIO	NITROUS OXIDE
ODC	ODOR CONTROL
OIL	OIL
FO	OIL - FUEL
OZN	OZONE
OZD	OZONE DESTRUCT
PPP	PHOSPHATE
PO4	PHOSPHORIC ACID
PCL	POLYALUMINUM CHLORIDE
POLF	POLYMER
PP	POTASSIUM PERMANGANATE
PAC	POWDERED ACTIVATE CARBON
PAR	PRE-AERATION
PSD	PRESEDIMENTATION
PRC	PRIMARY CLARIFICATION
PSC	PRIMARY SCUM
PRS	PRIMARY SLUDGE
WWP	RAW WASTEWATER PUMPING
RWP	RAW WATER PUMPING
RWS	RAW WATER STORAGE
RCS	RECIRCULATED SLUDGE
RCW	RECLAIMED WATER
REF	REFRIGERANT
R	RESIDUALS
RAS	RETURN ACTIVATED SLUDGE
ROS	REVERSE OSMOSIS
SCR	SCREENINGS
SCL	SECONDARY CLARIFICATION
SSC	SECONDARY SCUM
SED	SEDIMENTATION BASINS
SEP	SEPTAGE
SET	SETTLED WATER
SEW	SEWAGE
NAC	SODA ASH
NAL	SODIUM ALUMINATE
NAM	SODIUM ALUMINATE
NBC	SODIUM BICARBONATE
SB	SODIUM BISULFITE
NCL	SODIUM CHLORIDE
NCL2	SODIUM CHLORITE
NAF	SODIUM FLUORIDE
NAX	SODIUM HEXAMETAPHOSPHATE
NAOH	SODIUM HYDROXIDE
NOCL	SODIUM HYPOCHLORITE
NASF	SODIUM SILICOFLUORIDE
STM	STEAM
STS	STORM SEWER
STW	STORM WATER
SO2	SULFUR DIOXIDE
HSO4	SULFURIC ACID
SW	SURFACE WASH
TERT	TERTIARY TREATMENT
TPRS	THICKENED PRIMARY SLUDGE
TWAS	THICKENED WASTE ACTIVATED SLUDGE
THCK	THICKENING
TW	TREATED WATER
TF	TRICKLING FILTER
UV	ULTRAVIOLET
VAC	VACUUM
WW	WASH WATER
WAS	WASTE ACTIVATED SLUDGE
WWW	WASTE WASH WATER
CDW	WATER - CONDENSATE
COLW	WATER - COOLING
DW	WATER - DISTILLED WATER
FW	WATER - FIRE
IRW	WATER - IRRIGATION
OZW	WATER - OZONATED
SWT	WATER - SEAL
HW	WATER - WATER HEATING
DEIW	WATER DEIONIZED
NPW	WATER NON-POTABLE
PEW	WATER PLANT EFFLUENT
PW	WATER POTABLE
RW	WATER RAW
WWT	WET WEATHER TREATMENT
ZO	ZINC ORTHOPHOSPHATE

PROCESS CODE ABBREVIATIONS

ACE_X	ACETIC ACID
ACT_X	ACETYLENE
GAC_X	ACTIVATED CARBON - GRANULAR
AIR_X	AERATION AIR/PROCESS AIR
AER_X	AERATION SYSTEM
ARW_X	AIR WASH
ALS_X	ALUMINUM SULFATE
NSO4_X	AMMONIUM SULFATE
NH3_X	ANHYDROUS AMMONIA
AS_X	ANTI-SEALANT
NHOH_X	AQUA AMMONIA
ARG_X	ARGON
ASH_X	ASH
BWH_X	BACKWASH - MEMBRANE/FILTER
BAL_X	BALLASTED FLOCCULATION
BNR_X	BIOSOLIDS
BIO_X	BIOTOWER
BIT_X	BLENDED SLUDGE
BLS_X	BNR
BRN_X	BRINE
CACL_X	CALCIUM HYPOCHLORITE
CATS_X	CALCIUM THIOSULFATE
CO2_X	CARBON DIOXIDE
CAS_X	CARBON SLURRY
HCO3_X	CARBONIC ACID
CEN_X	CENTRATE
CEB_X	CHEMICAL ENHANCED BACKWASH - MEMBRANE
CL2_X	CHLORINE
CLO2_X	CHLORINE DIOXIDE
CA_X	CITRIC ACID
CIP_X	CLEAN IN PLACE
COA_X	COAGULATION
CAI_X	COMPRESSED AIR - INSTRUMENT
CMS_X	COMPRESSED AIR - SERVICE
CUS_X	COPPER SULFATE
CI_X	CORROSION INHIBITOR
DCL_X	DECHLORINATION
DET_X	DETERGENT
DWT_X	DEWATERING
FUE_X	DIESEL FUEL
DGG_X	DIGESTER GAS
DGM_X	DIGESTER GAS MIXING
DGS_X	DIGESTER SLUDGE
DGA_X	DIGESTION - AEROBIC
DIG_X	DIGESTION - ANAEROBIC
DCB_X	DISINFECTION CONTACT BASIN
DAF_X	DISSOLVED AIR FLOTATION
DRN_X	DRAINAGE
EFP_X	EFFLUENT PUMPING
EXH_X	ENGINE EXHAUST
EQB_X	EQUALIZATION BASIN
FEC_X	FERRIC CHLORIDE
FES_X	FERRIC SULFATE
FRC_X	FERROUS CHLORIDE
FRS_X	FERROUS SULFATE
FLT_X	FILTRATION
FLC_X	FLOCCULATION
GOX_X	GASEOUS OXYGEN
GSL_X	GASOLINE
GRS_X	GREASE
GRT_X	GRIT
HEL_X	HELIUM
HFL_X	HYDRAULIC FLUID
HCL_X	HYDROCHLORIC ACID
HFS_X	HYDROFLUOSILIC ACID (FLUORIDE)
HYD_X	HYDROGEN
PER_X	HYDROGEN PEROXIDE
INC_X	INCINERATION
INFP_X	INFLUENT PUMPING
INT_X	INTAKE
LAG_X	LAGOON STORAGE
LAP_X	LAND APPLICATION
CAH_X	LIME - HYDRATED
CAO_X	LIME - QUICKLIME
LIM_X	LIME STABILIZATION
LOX_X	LIQUID OXYGEN
LPG_X	LP GAS OR PROPANE GAS
MGOH_X	MAGNESIUM HYDROXIDE
MEM_X	MEMBRANE
MEG_X	METHANE GAS
MTH_X	METHANOL
MXL_X	MIXED LIQUOR
NG_X	NATURAL GAS
NIT_X	NITROGEN
NIO_X	NITROUS OXIDE
ODC_X	ODOR CONTROL
FO_X	OIL
OIL_X	OIL - FUEL
OZN_X	OZONE
OZD_X	OZONE DESTRUCT
PPP_X	PHOSPHATE
PO4_X	PHOSPHORIC ACID
PCL_X	POLYALUMINUM CHLORIDE
POLF_X	POLYMER
KMN_X	POTASSIUM PERMANGANATE
PAC_X	POWDERED ACTIVATE CARBON
PAR_X	PRE-AERATION
PSD_X	PRESEDIMENTATION
PRC_X	PRIMARY CLARIFICATION
PSC_X	PRIMARY SCUM
PRS_X	PRIMARY SLUDGE
WWP_X	RAW WASTEWATER PUMPING
RWP_X	RAW WATER PUMPING
RWS_X	RAW WATER STORAGE
RCS_X	RECIRCULATED SLUDGE
RCW_X	RECLAIMED WATER
REF_X	REFRIGERANT
RES_X	RESIDUALS
RAS_X	RETURN ACTIVATED SLUDGE
ROS_X	REVERSE OSMOSIS
SCR_X	SCREENINGS
SCL_X	SECONDARY CLARIFICATION
SSC_X	SECONDARY SCUM
SEP_X	SEPTAGE
SET_X	SETTLED WATER
SEW_X	SEWAGE
NAC_X	SODA ASH
NAL_X	SODIUM ALUMINATE
NAM_X	SODIUM ALUMINATE
NBC_X	SODIUM BICARBONATE
NHS_X	SODIUM BISULFITE
NCL_X	SODIUM CHLORIDE
NCL2_X	SODIUM CHLORITE
NAF_X	SODIUM FLUORIDE
NAX_X	SODIUM HEXAMETAPHOSPHATE
NAOH_X	SODIUM HYDROXIDE
NOCL_X	SODIUM HYPOCHLORITE
NASF_X	SODIUM SILICOFLUORIDE
STM_X	STEAM
STS_X	STORM SEWER
STW_X	STORM WATER
SO2_X	SULFUR DIOXIDE
HSO4_X	SULFURIC ACID
SW_X	SURFACE WASH
TERT_X	TERTIARY TREATMENT
TPRS_X	THICKENED PRIMARY SLUDGE
TWAS_X	THICKENED WASTE ACTIVATED SLUDGE
THCK_X	THICKENING
TW_X	TREATED WATER
TF_X	TRICKLING FILTER
UV_X	ULTRAVIOLET
VAC_X	VACUUM
WW_X	WASH WATER
WAS_X	WASTE ACTIVATED SLUDGE
WWW_X	WASTE WASH WATER
CDW_X	WATER - CONDENSATE
COLW_X	WATER - COOLING
DW_X	WATER - DISTILLED WATER
FW_X	WATER - FIRE
IRW_X	WATER - IRRIGATION
OZW_X	WATER - OZONATED
SWT_X	WATER - SEAL
HW_X	WATER - WATER HEATING
DEIW_X	WATER DEIONIZED
NPW_X	WATER NON-POTABLE
PEW_X	WATER PLANT EFFLUENT
PW_X	WATER POTABLE
RW_X	WATER RAW
WWT_X	WET WEATHER TREATMENT
ZOP_X	ZINC ORTHOPHOSPHATE

X = PROCESS CODE SUFFIX USED TO FURTHER SPECIFY A PROCESS STREAM (I.E. CL2_G FOR CHLORINE GAS OR CL2_S FOR CHLORINE SOLUTION)

FUNCTION CODE ABBREVIATIONS

ACMB	ACTIVATION CHAMBER
AFD	ADJUSTABLE FREQUENCY DRIVE
ACD	AERATOR, COARSE BUBBLE DIFFUSED
AEFD	AERATOR, FINE PORE DIFFUSED
AFS	AERATOR, FLOATING SURFACE
AES	AERATOR, SURFACE
AFC	AFTERCOOLER
AD	AIR DRYER
AF	AIR FILTER
AR	AIR RECEIVER OR REGULATOR
AS	AIR SEPARATOR
AST	AIR STRIPPER
BFP	BACKFLOW PREVENTER
BSNA	BASIN, AERATION
BSNX	BASIN, ANOXIC/OXIC
BNR	BASIN, BNR
BSNC	BASIN, CHLORINE CONTACT
BSNO	BASIN, OXIC
RBSN	BASIN, RECTANGULAR SEDIMENTATION
BFPS	BELT FILTER PRESS
B	BIN (STORAGE - ALL TYPES)
BA	BIN ACTIVATOR
BLC	BLOWER, CENTRIFUGAL
BL	BLOWER, POSITIVE DISPLACEMENT
BLR	BOILER
BDZ	BULLDOZER
CCLM	CALIBRATION COLUMN
CFG	CENTRIFUGE
CHF	CHEMICAL FEEDER
CGS	CHLORINE GAS SCRUBBER
PCLR	CLARIFIER, PRIMARY
SCLR	CLARIFIER, SECONDARY
CGR	CLASSIFIER, GRIT
CW	CLEARWELL
CMP	COMPRESSOR
CMB	COMPRESSOR, LIQUID RING
CMR	COMPRESSOR, ROTARY SCREW
CMPS	COMPRESSOR, STEAM
CTR	CONTAINER, PROCESS
COB	CONVEYOR, BELT
COS	CONVEYOR, SCREW
CFA	COVER, ALUMINUM DOME BASIN
CFD	COVER, FIXED DIGESTER
CFL	COVER, FLOATING DIGESTER
DCG	COVER, GAS HOLDER
DCM	COVER, MEMBRANE
CRN	CRANE
CRG	CRANE, GANTRY
CRJ	CRANE, JIB
CRP	CRANE, PORTABLE GANTRY
CRT	CRANE, TRAVELLING BRIDGE
CYL	CYLINDER, CHLORINE
CYG	CYLINDER, GAS
DWS	DEWATERING SCREW
DPS	DIAPHRAGM SEAL
DIF	DIFFUSER, CHANNEL
DFB	DIFFUSER BANK
DIP	DIFFUSER, PIPELINE
DIR	DIFFUSER, TANK
DGE	DIGESTER, AEROBIC
DGAP	DIGESTER, ANAEROBIC PRIMARY
DGAS	DIGESTER, ANAEROBIC SECONDARY
DSUV	DISINFECTION UNIT, UV
DAF	DISSOLVED AIR FLOTATION THICKENER
DUC	DUST COLLECTOR
EDC	EDUCTOR
EG	ENGINE GENERATOR
EQPE	ELECTRICAL EQUIPMENT, GENERAL
EWSH	EMERGENCY EYE WASH FOUNTAIN
ESHR	EMERGENCY SHOWER
EWEW	EMERGENCY SHOWER & EYEWASH
EQPB	EQUIPMENT, BUILDING SERVICES
EQPT	EQUIPMENT, GENERAL OR UNSPECIFIED
EV	EVAPORATOR
EXC	EXPANSION CHAMBER
FAX	FAN, AXIAL FLOW
FAN	FAN, CENTRIFUGAL
FST	FENCE STIRRER
FTSP	FILTER GAS PARTICULATE
FLC	FILTER, CARTRIDGE TYPE
FLT	FILTER, UNDERDRAINS OR PRESSURE
FSW	FILTER. SURFACE WASH EQUIPMENT
FTTNG	FITTING, MISCELLANEOUS
FAR	FLAME ARRESTER
FC	FLAME CHECK
FLCH	FLOCCULATOR, HORIZONTAL
FLCV	FLOCCULATOR, VERTICAL
FD	FLOOR DRAIN
FS	FLOW SPLITTER
FE	FLUME, PARSHALL
FMSP	FOAM SEPARATOR
FL	FORKLIFT
CHF	GAS FEEDER
GF	GAS FLARE
GWH	GAS WATER HEATER
GFL	GATE, FLAP
SLG	SLIDE GATE
SG	SLUICE GATE
G	GATE, WEIR
GBT	GRAVITY BELT THICKENER
GVT	GRAVITY THICKENER
GRD	GRINDER PULVERIZER
GRB	GRIT BASIN, VORTEX TYPE
GRV	GRIT SCREW CONCENTRATOR
HEX	HEAT EXCHANGER
HST	HOIST
HSC	HOIST, CHAIN
HSE	HOIST, WIRE ROPE
HYDF	HYDRANT, FIRE
HYDW	HYDRANT, WALL
HYC	HYDROCYCLONE
INJ	INJECTOR, CHEMICAL
LS	LIME SLAKER
MFM	MEMBRANE
MBMF	MEMBRANE, MICROFILTRATION
MBNF	MEMBRANE, NANOFILTRATION
MBRO	MEMBRANE, REVERSE OSMOSIS
MBUF	MEMBRANE, ULTRAFILTRATION
MXC	MIXER, CARBON
FLM	MIXER, FLOCCULATION
M	MOTOR
MXI	MIXER, IN-LINE
MXPG	MIXER, PUGMILL
MXR	MIXER, RAPID
MXS	MIXER, STATIC
MXP	MIXER, SUBMERSIBLE, PROP OR BLENDER
MM	MUFFIN MONSTER
ORD	OVERFLOW ROOF DRAIN
ODU	OZONE DESTRUCT UNIT
OGEN	OZONE GENERATOR
PSU	OZONE POWER SUPPLY UNIT
PP	PACKAGED PLANT
PCN	PARTICLE COUNTER
PLT	PELLETIZER
PS	PENSTOCK
PIPE	PIPE
PSE	PLATE SETTLER
INJ	POLYMER INJECTOR RING
PBC	PRESSURE BUILDING COIL
PD	PULSATION DAMPNER
PAD	PUMP, AIR DIAPHRAGM
PCL	PUMP, CENTRIFUGAL
PDM	PUMP, DIAPHRAGM METERING
PHW	PUMP, HEATING WATER
PHE	PUMP, HORIZONTAL END SUCTION
PSC	PUMP, HORIZONTAL SPLIT CASE
PPS	PUMP, PERISTALTIC
PPL	PUMP, PLUNGER
PPC	PUMP, PROGRESSING CAVITY
PSE	PUMP, SCREW ENCLOSED
PSE	PUMP, SCREW OPEN
PCL	PUMP, SUBMERSIBLE
PCH	PUMP, SUBMERSIBLE CHOPPER
PSS	PUMP, SUBMERSIBLE SUMP
SP	SUMP PUMP
P	PUMP, POSITIVE DISPLACEMENT, ROTARY, DRUM OR BELL MOUNTED
PVD	PUMP, VERTICAL DIFFUSION VANE
PVE	PUMP, VERTICAL END SUCTION
PVW	PUMP, VERTICAL WET PIT
RSV	RESERVOIR
RCO	RESIDUAL COLLECTOR
RM	ROTAMETER
RD	RUPTURE DISK
SAMP	SAMPLER
SCL	SCALE
SC	SCALE, WEIGHT
SCRHT	SCREEN, HORIZONTAL
SCRI	SCREEN, INLINE SLUDGE
SCRA	SCREEN, MANUAL OR MECH CLEANED BAR
SCRS	SCREEN, STEP
SCT	SCREEN, TRAVELLING WATER
SCR	SCREEN, VIBRATORY
SCU	SCRUBBER
SMC	SCUM COLLECTOR
SCW	SCUM WEIR - ROTATING
SEP	SEPARATOR, MOISTURE OR CYCLONE
SGT	SIGHT GLASS - TALL
SG	SIGHT GAUGE
SIL	SILENCER
SLC	SLUDGE COLLECTOR, CIRCULAR
GCLR	SLUDGE COLLECTOR, CROSS
SFC	SLUDGE COLLECTOR, FLOC-CLARIFYING
SCS	SLUDGE COLLECTOR, SEC CLARIFIERS
SSC	SLUDGE COLLECTOR, SOLIDS CONTACT
SLCS	SLUDGE COLLECTOR, STRAIGHT LINE
GRD	SLUDGE GRINDER, INLINE OR CHANNEL
SBL	SOLIDS BLENDER-INLINE
STR	STRAINER
STRB	STRAINER BASKET TYPE
STRY	STRAINER Y TYPE
SRCH	SURGE CHAMBER
TSA	TANK, ABOVE GROUND STORAGE
TCN	TANK, AMMONIA STORAGE
TCR	TANK, CRYOGENIC STORAGE
DWT	TANK, DOUBLE WALL
TSE	TANK, ELEVATED STORAGE
TX	TANK, EXPANSION
TNK	TANK, FRP CHEMICAL STORAGE
TNK	TANK, GENERAL OR UNSPECIFIED
TCP	TANK, METHANOL
SMPT	TANK, SAMPLER
TCS	TANK, CHLORINE CONTACTOR
TSW	TANK, FLAT TOP STEEL WATER
TRP	TRAP, DRIP
TRPS	TRAP, SEDIMENT
TRK	TRUCK
TB	TURBINE
TBC	TURBINE COMPRESSOR
TBG	TURBINE ENGINE
UPS	UNINTERRUPTABLE POWER SUPPLY
UVE	UV REACTOR
UVL	UV REACTOR, HORIZONTAL OR VERTICAL
VB	VACUUM BREAK
VRG	VACUUM REGULATOR
AVR	VALVE, AIR RELEASE
CAV	COMBINATION AIR/VACUUM VALVE
VAG	VALVE, ANGLE
BV	AWWA BALL VALVE
BFV	AWWA BUTTERFLY VALVE
VBFP	VALVE, BACKFLOW PREVENTER
VBM	VALVE, BALL MISCELLANEOUS
VC	VALVE, CHECK
VCN	VALVE, CONE
VDG	VALVE, DIAPHRAGM OPERATED
VGD	VALVE, DOUBLE DISC GATE
EPV	VALVE, ECCENTRIC PLUG
VER	VALVE, EXPLOSION RELIEF
VFW	VALVE, FOUR WAY
GV	GATE VALVE
V	VALVE, GENERAL OR UNSPECIFIED
VGL	VALVE, GLOBE
VBI	VALVE, INDUSTRIAL BUTTERFLY
VKG	VALVE, KNIFE GATE
VMR	VALVE, MATERIAL HANDLING ROTARY
VMD	VALVE, MUD
VND	VALVE, NEEDLE
PTV	VALVE, PILOT
VPN	VALVE, PINCH
VPO	VALVE, PISTON OPERATED
PV	NON-ECCENTRIC PLUG VALVE
VPC	VALVE, PRESSURE REDUCING
VPC	VALVE, PRESSURE SUSTAINING
VSP	VALVE, PRESSURE RELIEF
VSPV	VALVE, PRESSURE/VACUUM RELIEF
VP	VALVE, PROCESS
VGR	VALVE, RESILIENT SEATED GATE
VS	VALVE, SAFETY
VSLV	VALVE, SLEEVE
VSL	VALVE, SOLENOID
VTV	VALVE, TELESCOPING
VTS	VALVE, THERMAL SHUTOFF
VTW	VALVE, THREE WAY
VVB	VALVE, VACUUM BREAKER
VSV	VALVE, VACUUM RELIEF
VVP	VALVE, V-PORT BALL
VAP	VAPORIZER
VSLB	VESSEL, BOOT
WC	WEIR, CIPOLETTI
WR	WEIR, RECTANGULAR
WV	WEIR, V-NOTCH
WLHC	WELL, HORIZONTAL COLLECTOR
WLV	WELL, VERTICAL

SEQUENCE CODES

00XX	GENERAL
15XX	RAW WATER
20XX	NEILSON 1/2 RAW WATER & COMMON
21XX	NEILSON 1 SEDIMENTATION BASINS
22XX	NEILSON 2 SEDIMENTATION BASINS
23XX	NEILSON 1 FILTERS
24XX	NEILSON 2 FILTERS
25XX	NEILSON 1/2 COMBINED FILTER EFFLUENT
30XX	NEILSON 3 RAW WATER & COMMON
31XX	NEILSON 3 SEDIMENTATION BASINS
33XX	NEILSON 3 FILTERS
40XX	NEILSON 4 RAW WATER & COMMON
41XX	NEILSON 4 SEDIMENTATION BASINS
43XX	NEILSON 4 FILTERS
44XX	NEILSON 3/4 COMBINED FILTER EFFLUENT
45XX	NEILSON 3/4 ELECTRICAL BUILDING
50XX	MISCELLANEOUS YARD
52XX	CLEARWELLS
54XX	BACKWASH SUPPLY
58XX	FINISHED WATER
59XX	CLEMMONS PUMPS
61XX	LAGOONS
65XX	WASH WATER EQ
66XX	WASH WATER CLARIFIER
70XX	CHEMICAL BUILDING GENERAL
71XX	ALUM
72XX	SODIUM HYDROXIDE
73XX	SODIUM HYPOCHLORITE
74XX	ORTHOPHOSPHATE
75XX	HFS (FLUORIDE)
76XX	CALCIUM THIOSULFATE
80XX	SWITCHGEAR

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE
D	AD	RE	MT	FEB 2019	100% SUBMITTAL
C	AD	RDT	MT	NOV 2018	90% SUBMITTAL
B	AD	UB	RDT	SEPT 2018	60% SUBMITTAL
A	AD	MM	RDT	JULY 2018	30% SUBMITTAL

50.3040 - General Drawings
I-03.dwg

XREF1:
XREF2:
XREF3:
XREF4:

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PLOTTED: GAMT8713, 2/12/2019 2:39:21 PM
USER: GAMT8494
DWG VER: 7000

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

INSTRUMENTATION
LEGEND & ABBREVIATIONS
SHEET 3 OF 3

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

I-03
SHEET
32 OF 35

FD7000
198898

SCADA HMI

EXISTING PLC SP-2

IN AUTO / RUNNING / COMMON FAIL

YI 204 / YIR 204 / UA 204

YI 202 / YIR 202 / UA 202

YI 203 / YIR 203 / UA 203

YI 201 / YIR 201 / UA 201

RESET OO

HS 204 / HS 204 / YLR 204 / UA 204

HS 202 / HS 202 / YLR 202 / UA 202

HS 203 / HS 203 / YLR 203 / UA 203

HS 201 / HS 201 / YLR 201 / UA 201

480V FROM MCC-1A ELECTRICAL BUILDING 2

480V FROM MCC-2A ELECTRICAL BUILDING 2

HI LEVEL

LAH 204 / TAH 204 / TAH 204

LAH 202 / TAH 202 / TAH 202

LAH 203 / TAH 203 / TAH 203

LAH 201 / TAH 201 / TAH 201

HOA

I / PAH 204 / HS 204

I / PAH 202 / HS 202

I / PAH 203 / HS 203

I / PAH 201 / HS 201

CONTROL PANEL

PSH 204 / PI 204

PSH 202 / PI 202

PSH 203 / PI 203

PSH 201 / PI 201

LS 204

LS 202

LS 203

LS 201

4"-DIP

VP-204

VP-206

VP-208

VP-210

TSH 204

TSH 202

TSH 203

TSH 201

PPC-204

PPC-202

PPC-203

PPC-201

CLA-VALVE

VP-205

VP-207

VP-209

VP-211

EXISTING SEECONDARY CLARIFIER NO.4

EXISTING SEECONDARY CLARIFIER NO.2

EXISTING SEECONDARY CLARIFIER NO.3

EXISTING SEECONDARY CLARIFIER NO.1

TO SLUDGE STORAGE TANKS

NOTES :

1. SEE LEGEND AND ABBREVIATIONS ON DRAWINGS I-01, I-02, AND I-03.
2. FACILITY CODE IS "SCM" FOR ALL INSTRUMENTATION EQUIPMENT, AND VALVING OTHERWISE NOTED.
3. LOCAL CONTROL DEVICES, SUCH AS LIGHTS AND SWITCHES LOCATED ON MCCS OR ON EQUIPMENT MAY NOT BE SHOWN ON THIS P&ID.
4. SPARE I/O's WITHIN EXISTING PLC SHALL BE USED TO ACCOMMODATE ADDITIONAL I/O's.

NO.	BY	CK	APP
A	VD	MM	RDT
B	AD	UB	RDT
C	AD	RDT	MT
D	AD	RE	MT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL
NOV 2018	30% SUBMITTAL

50.3040 - Electrical Drawings

I-04.dwg

SAVED: GWT8494, 11-09-18 5:18:32 PM

PLOTTED: DONS2458, 04-07-2018 16:53:10

USER: GWT8494 DWG VER: 7000

XREF1:

XREF2:

XREF3:

XREF4:

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

P&ID
SCUM PUMP STATION, CLARIFIERS 1-4

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

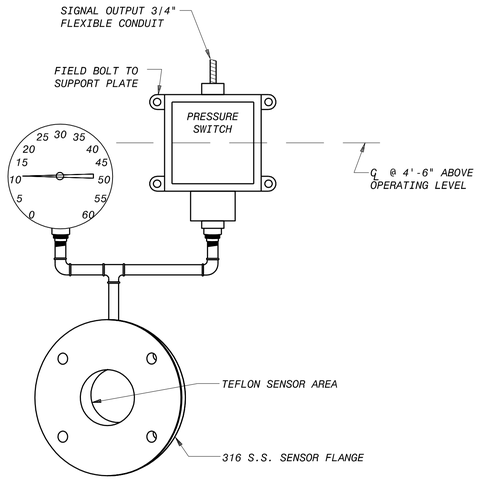
0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

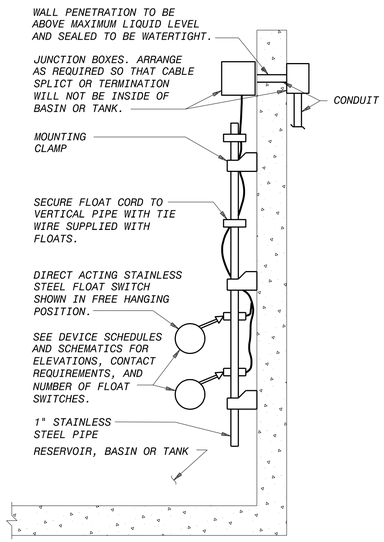
I-04
SHEET
33 OF 35

FD7000
198898



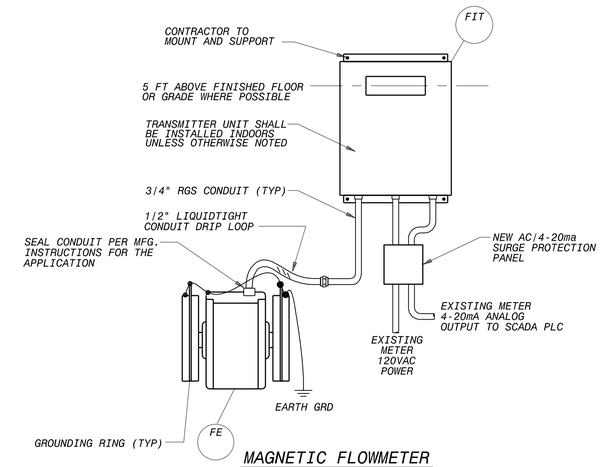
PRESSURE SWITCH & GAUGE WITH ANNULAR TYPE DIAPHRAGM SEAL INSTALLATION DETAIL

NO SCALE
(PI-201, PI-202, PI-203, PI-204)
(PSH-201, PSH-202, PSH-203, PSH-204)



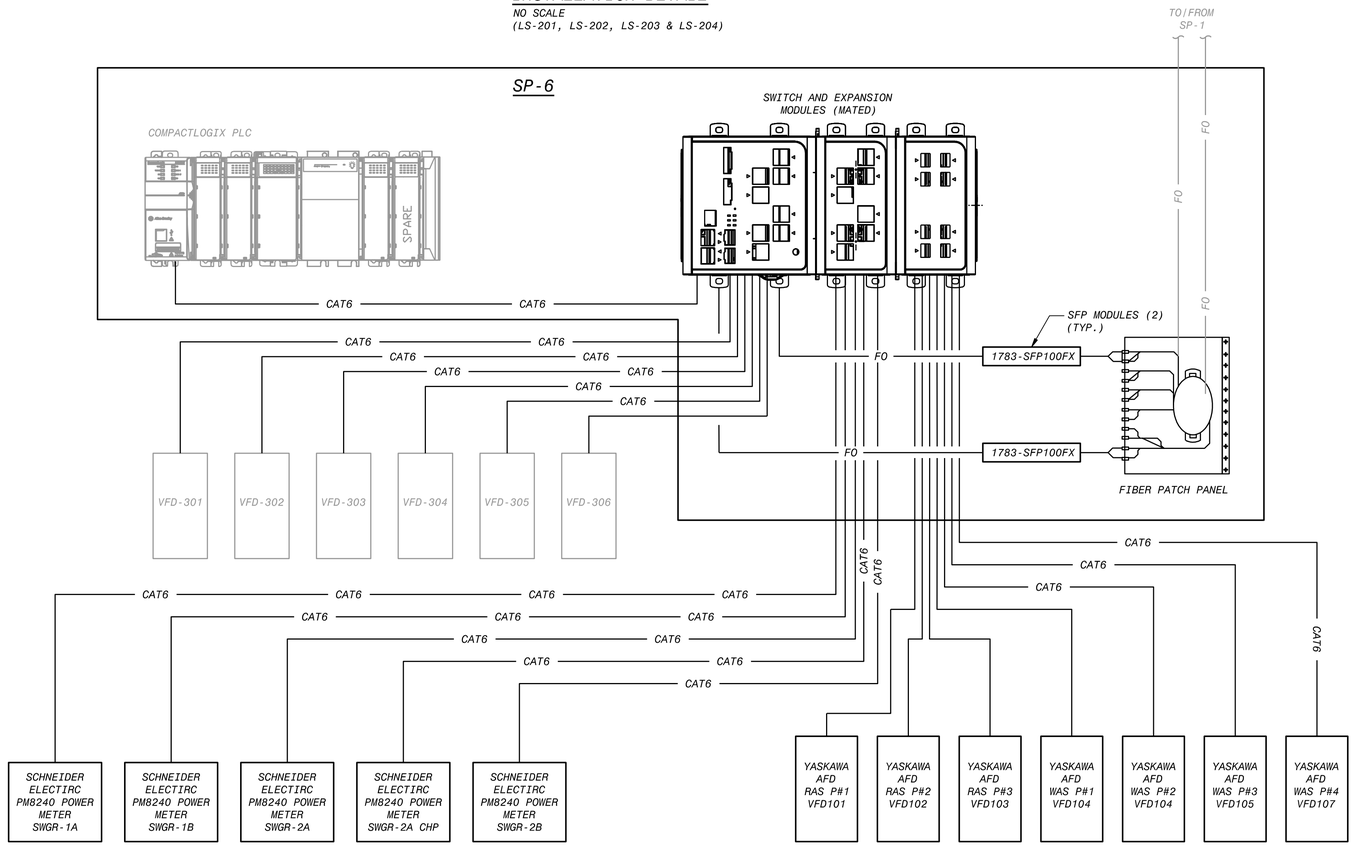
FIXED MOUNT FLOAT SWITCH INSTALLATION DETAIL

NO SCALE
(LS-201, LS-202, LS-203 & LS-204)



MAGNETIC FLOWMETER INSTALLATION DETAIL

NO SCALE
NOTE: PIPE TO BE SUPPORTED ON BOTH SIDES OF METER.



SP-6 PLC AND SWITCH INSTALLATION DETAIL

NO SCALE

NO.	BY	CK APP
C	AD	RE MT
B	AD	RDT MT
A	AD	UB RDT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50.3050 - Process-Instrumentation Diagrams Drawings
I-05.dwg

XREF1:
XREF2:
XREF3:
XREF4:

SAVED:DON52458, 01-11-2018 10:12:36
PLOTTED:DON52458, 04-07-2018 16:53:10
USER:DON52458 DWG VER:1000

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

INSTRUMENTATION
INSTRUMENT INSTALLATION DETAILS

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
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PROJECT NO.
198898

I-05
SHEET
34 OF 35

FD7000
198898

MCC-5
MCC-6
BELT FILTER PRESS #1-CONTROL PANEL
BELT FILTER PRESS #2-CONTROL PANEL

EXISTING SCADA PANEL 4
EXISTING DEWATERING AND CHLORINATION
IN INSTRUMENTATION OFFICE

NEMA 4X S.S. ENCLOSURE
EXISTING REMOTE PANEL OUTSIDE INSTRUMENTATION OFFICE
OPI
24VDC
DH+
13-SLOT RACK
PS PLC DI DI DI DO DO AI SPARE SPARE AI AI AI AO AO DO SPARE
DH+ FEMALE PLUG FOR FOR PROGRAMMING TERMINAL
FIBER OPTIC PATCH PANEL
NEMA 4X S.S. ENCLOSURE

EXISTING PLC
PLC
L
MARS. SE
ETHERNET SWITCH

EXISTING P I C
EXISTING CONTROL BUILDING
EXISTING CONTROL CONSOLE
OPI
24VDC
DH+ FEMALE PLUG FOR PROGRAMMING TERMINAL
DH+
10-SLOT RACK
PS PLC SN DO DO SPARE AI AI AI AI
10-SLOT RACK
PS SB SPARE SPARE AO AO AO AO AO
FIBER OPTIC PATCH PANEL
FILTER FLOW METERS
LOCAL INSTRUMENATATION

I-NET RADIO.

EXISTING GBT-CP-1
GRAVITY BELT THICKENER CONTROL PANEL
OPI
24VDC
DH+
10-SLOT RACK
PS PLC DI DI DO DO DO AI AO
FIBER OPTIC PATCH PANEL
GRAVITY BELT THICKENER COMPONENTS
INLET SLUDGE FLOW METER POLYMER FEED RATE CONTROL

EXISTING FIBER OPTIC TOPOLOGY PROVIDES "SELF HEALING" IN A COUNTER-ROTATING REDUNDUNT RING FORMAT-EMULATES DH+

EXISTING SCADA PANEL 1 NEMA 1 ENCLOSURE
EXISTING MCC/BLOWER BUILDING #2
SP-1
DH+
OPI
24VDC
13-SLOT RACK
PS PLC SN AI AI AI AI AI AI AI AI AI AI AI
13-SLOT RACK
PS SB DI DI DI SPARE AO AO AO AO SPARE
13-SLOT RACK
PS SB DI DI DI SPARE SPARE SPARE SPARE SPARE DO DO
OWNER PROVIDED
BACKUP
MASTER
OWNER PROVIDED
COUNTY NETWORK
CAT6 CABLE
USB PRINTER
TO SCADA HOUSE
TO RADIO
MCC-11
MCC-12
VFD'S [RAS (3)]
VFD'S [WAS (4)]
VFD'S [EFFLUENT (8)]
LOCAL INSTRUMENTATION
CLARIFIERS
FLASH MIXER
SCUM EJECTORS
PLAN DRAIN P.S.

LEGEND
C CONTROL WIRING TERMINAL BOX
I INSTRUMENTATION WIRING TERMINAL BOX
FO-X FIBER OPTIC CABLE IDENTIFICATION NUMBER CABLES TO BE TAGGED AT EVERY BOX

EXISTING SCADA PANEL 2
EXISTING MCC/BLOWER BUILDING #2
SP-2
MCC-1
MCC-2
MCC-3
MCC-4
BLOWER CP-1
BLOWER CP-2
REJECT PS.S
EQUALIZATION TANK INSTRUMENTS
(FROM HEADWORKS)
MCC-1A
MCC-2A
GRIT PANELS
BAR SCREEN PANEL
ANOXIC BASINS ODOR CONTROL
OPI
24VDC
DH+
13-SLOT RACK
PS PLC SN AI AI AI AI SPARE SPARE SPARE SPARE SPARE SPARE SPARE AO
FIBER OPTIC PATCH PANEL
13-SLOT RACK
PS SB DI DI DI DI DI DI SPARE SPARE SPARE SPARE SPARE SPARE
ETHERNET SWITCH
FO
CAT6
13-SLOT RACK
PS SB DO DO DO DO DO DO DO DO DO DO SPARE SPARE
ETHERNET SWITCH
SCUM PUMP STATION

EXISTING SCADA PANEL 3
MCC/BLOWER BUILDING #3
DH+
13-SLOT RACK
PS PLC DI DI DA AI AI AI AO AO AO DO SPARE
FIBER OPTIC PATCH PANEL
NEMA 1 ENCLOSURE
BLOWER CP-1
BLOWER CP-2
REJECT CP-3
MCC-7
MCC-8
SLUDGE PUMP VFD'S (8)
LOCAL INSTRUMENTATION

SP-6 PLC PANEL
NOTE 4
FO
TO/FROM SP-1
CAT6

CAT6 SCHNEIDER ELECTIRC PM8240 POWER METER SWGR-1A
CAT6 SCHNEIDER ELECTIRC PM8240 POWER METER SWGR-1B
CAT6 SCHNEIDER ELECTIRC PM8240 POWER METER SWGR-2A
CAT6 SCHNEIDER ELECTIRC PM8240 POWER METER SWGR-2A CHP
CAT6 SCHNEIDER ELECTIRC PM8240 POWER METER SWGR-2B

CAT6 VFD-301
CAT6 VFD-301
CAT6 VFD-301
CAT6 VFD-301
CAT6 VFD-301
CAT6 VFD-301
CAT6 YASKAWA AFD RAS P#1 VFD101
CAT6 YASKAWA AFD RAS P#2 VFD102
CAT6 YASKAWA AFD RAS P#3 VFD103
CAT6 YASKAWA AFD WAS P#1 VFD104
CAT6 YASKAWA AFD WAS P#2 VFD104
CAT6 YASKAWA AFD WAS P#3 VFD105
CAT6 YASKAWA AFD WAS P#4 VFD107

NEMA 4X PANEL ENCLOSURE TO ACCOMODATE SCADA STATION
LOCATION : RAS/WAS AREA
PHOENIX CONTACT INDUSTRIAL PC, CiTECT SCADA CONTROL CLIENT
ETHERNET SWITCH
APC PRO-700 UPS
FO
FO
FO

NOTES:

1. HIGHLIGHTED ITEMS INDICATE EQUIPMENT TO BE PROVIDED AS PART OF THIS PROJECT. GRAY ITEMS INDICATE EXISTING EQUIPMENT.
2. COORDINATE EQUIPMENT IP ADDRESSING STRUCTURE WITH THE OWNERS INFORMATION SERVICES DEPARTMENT (ISD).
3. SCUM PUMP STATION I/Os SHALL BE CONNECTED TO SPARE I/O POINTS ON THE EXISTING PLC.
4. REPLACE EXISTING ETHERNET SWITCHES WITH STRATIX 8300 SWITCH & EXPANSION MODULES

FD7000
198898

NO.	BY	CK	APP
C	AD	RE	MT
B	AD	RDT	MT
A	AD	UB	RDT

REVISIONS AND RECORD OF ISSUE

DATE	
FEB 2019	100% SUBMITTAL
NOV 2018	90% SUBMITTAL
SEPT 2018	60% SUBMITTAL

50.3050 - Process-Instrumentation Diagrams Drawings I-06.dwg

XREF1:
XREF2:
XREF3:
XREF4:

SAVED:GWM78713 2/12/2019 2:51:02 PM
PLOTED:DON52458, 04-07-2018 16:53:10
USER:GWM78713 DWG VER:7000

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MANATEE COUNTY, FLORIDA
SOUTHEAST WATER RECLAMATION FACILITY
RAS/WAS SYSTEM UPGRADE

INSTRUMENTATION NETWORK BLOCK DIAGRAM

DESIGNED: RT
DETAILED: SG
CHECKED: LB
APPROVED: MT
DATE: FEB 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
198898

I-06
SHEET
35 OF 35