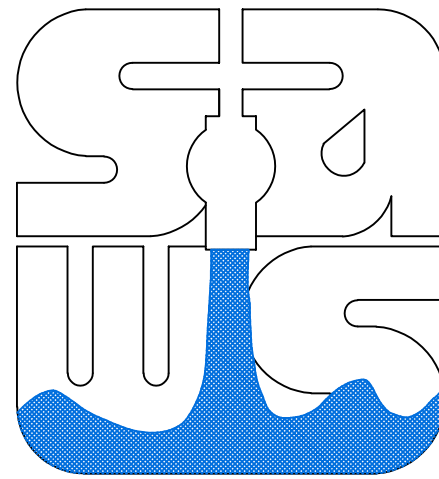
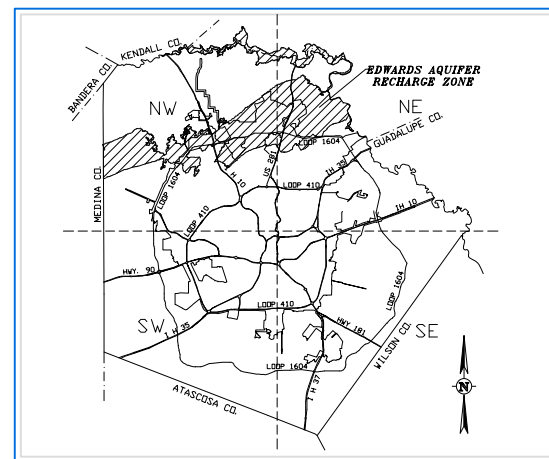


SAN ANTONIO WATER SYSTEM



LIFT STATION DESIGN AND CONSTRUCTION STANDARD DRAWINGS

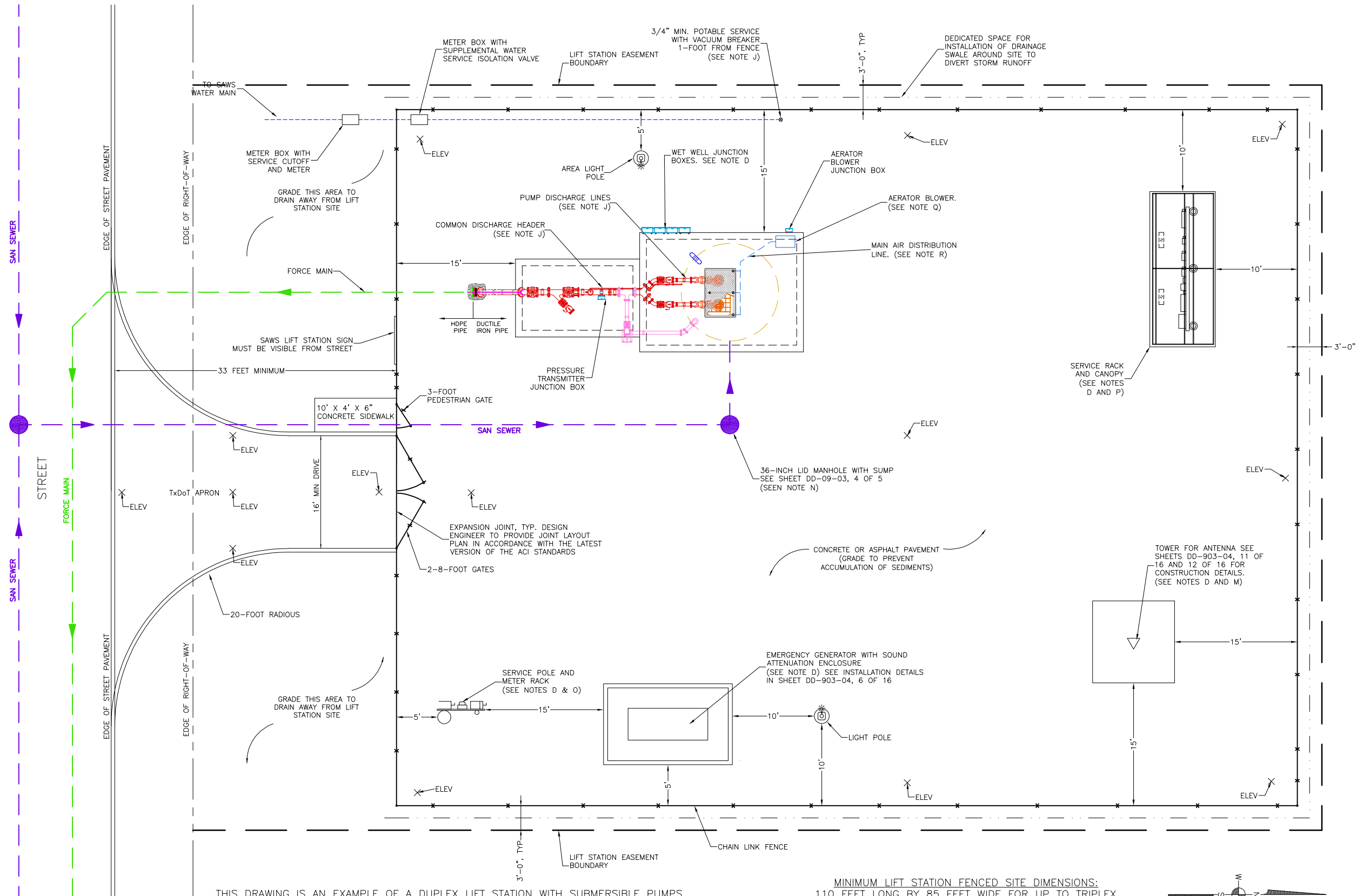


LOCATION MAP
N.T.S.

ADDRESS: 2800 US HWY 281 NORTH
SAN ANTONIO TEXAS 78212

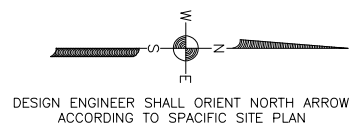
JUNE, 2026

PLANTS AND MAJOR PROJECTS



THIS DRAWING IS AN EXAMPLE OF A DUPLEX LIFT STATION WITH SUBMERSIBLE PUMPS. THE DESIGN ENGINEER MUST MODIFY THIS SITE LAYOUT AND DRAW SITE PLAN TO SCALE. MAINTAIN THE MINIMUM FENCED SITE DIMENSIONS AND ASSURE ALL DEDICATED WORKING SPACES AND CLEARANCES ARE IN COMPLIANCE WITH SAWS LIFT STATION DESIGN AND CONSTRUCTION GUIDELINES. COORDINATION WITH SAWS AND CPS ENERGY IS RECOMMENDED TO PROPERLY COORDINATE THE FINAL LIFT STATION SITE LOCATION AND LAYOUT.

MINIMUM LIFT STATION FENCED SITE DIMENSIONS:
110 FEET LONG BY 85 FEET WIDE FOR UP TO TRIPLEX LIFT STATIONS COMPLIANT WITH THIS SITE LAYOUT. FOR DIFFERENT SITE LAYOUTS OR LIFT STATIONS WITH FOUR OR FIVE PUMPS, THE FENCED SITE DIMENSIONS WILL LIKELY BE REQUIRED TO BE LARGER.



NOTES TO DESIGN ENGINEER:

- THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE A DESIGN STANDARD FOR THE CONSTRUCTION OF SAN ANTONIO WATER SYSTEM SUBMERSIBLE PUMP LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION SITE LAYOUT DESIGNS. IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO COMPLY WITH SAWS STANDARDS.
- WHEN REQUIRED, SPECIFY NATIVE LOW MAINTENANCE LANDSCAPING OUTSIDE OF FENCED AREA IN ACCORDANCE WITH THE CURRENT CITY OF SAN ANTONIO ORDINANCE. PROVIDE LANDSCAPING ON SIDES AND IN REAR OF SITES AS REQUIRED. DESIGN ENGINEER TO SPECIFY IRRIGATION SYSTEM FOR LANDSCAPING INCLUDING ELECTRIC VALVES AND IRRIGATION CONTROLLERS.
- DESIGN ENGINEER SHALL MAKE IT ALL POSSIBLE TO ADOPT THE GENERAL SITE LAYOUT AS SHOWN HERE. IF SITE LAYOUT WILL BE DIFFERENT, STRICT COORDINATION SHALL BE MAINTAINED WITH SAWS, BUT THE ORIENTATION OF THE ELECTRIC RACK AND CANOPY AND THE LOCATION OF THE TOWER WITH RESPECT TO THE ELECTRIC RACK AND CANOPY SHALL BE MAINTAINED AS SHOWN IN STANDARD LAYOUT.
- PLEASE SEE PLAN VIEW AND SECTION L "SAFETY AND SECURITY REQUIREMENTS" OF SAWS LIFT STATION DESIGN AND CONSTRUCTION STANDARDS FOR REQUIRED DEDICATED WORKING SPACE AND CLEARANCES.
- THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD DRAWINGS AND DETAILS INTO THE PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCE NOTES ACCORDINGLY.
- THE DESIGN ENGINEER SHALL CONSULT THE SAN ANTONIO WATER SYSTEM LIFT STATION DESIGN AND CONSTRUCTION STANDARDS AND THE UTILITY SERVICE REGULATIONS MANUAL FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT LIFT STATION DESIGN.
- THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THIS NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE LIFT STATION STANDARD DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.
- PROVIDE PERMANENT PROTECTION AGAINST EROSION AND STORM RUNOFFS TO PREVENT COLLECTION OF SEDIMENTATION AND PUDDLING WITHIN THE LIFT STATION SITE BY RAISING THE FENCE MOW STRIP BY AT LEAST 6 INCHES AND BY DESIGNING A DRAINAGE SWALE OUTSIDE THE FENCE AND AROUND THE LIFT STATION SITE. ACCESS ROAD MUST ALSO BE PROTECTED AGAINST EROSION AND ACCUMULATION OF STORM RUNOFF SEDIMENTS.
- ALL CONCRETE SLABS SHALL BE LEVELED 3" TO 6" ABOVE FINISH ASPHALT PAVED SURFACE.
- PROVIDE FREEZE PROTECTION TO HOSE BIB, PRESSURE TRANSMITTER ASSEMBLY AND PRESSURE GAUGE ASSEMBLY, AND TO ALL DISCHARGE LINES 6-INCH IN DIAMETER AND SMALLER
- PROPOSED ELEVATIONS SHALL BE SHOWN AT THE SPECIFIED POINTS MARKED IN THIS LAYOUT.
- TOWER STRUCTURE SHALL BE LOCATED MINIMUM 40-FOOT AWAY FROM EXISTING UTILITY OVERHEAD LINES, AND SHALL BE PROVIDED WITH A MINIMUM RADIUS CLEARANCE OF 115% OF THE TOTAL TOWER HEIGHT FROM ANY PUBLIC, RESIDENTIAL, COMMERCIAL AND INDUSTRIAL STRUCTURE, AS REQUIRED BY THE CITY OF SAN ANTONIO CODE. SEE LIFT STATION DESIGN AND CONSTRUCTION STANDARDS FOR FURTHER TOWER STANDARDS AND REQUIREMENTS.
- OVERHEAD LINES INCLUDING, BUT NOT LIMITED ELECTRIC, CABLE AND TELEPHONE ARE NOT ALLOWED WITHIN LIFT STATION SITE.
- LOCATE MANHOLE NEXT TO WET WELL AND WITHIN VEHICULAR ACCESS AREA.
- WIRING BETWEEN SERVICE POLE AND SERVICE RACK SHALL BE BURIED. AERIAL WIRING IS PROHIBITED.
- ELECTRIC SERVICE RACK AND CANOPY SHALL BE ORIENTED TO HAVE ALL ELECTRICAL ENCLOSURES OPEN SOUTH. THIS SHALL BE THE PRIMARY CRITERIA FOR DEFINING A SITE LAYOUT, UNLESS SAWS REQUIRES AN ELECTRICAL BUILDING.
- LOCATE AERATOR BLOWER UNIT ON THE DESIGNATED WET WELL SLAB AREA AND ORIENT IN A MANNER THAT THE PREVAILING WIND PROVIDES THE BEST NATURAL AIR CIRCULATION FOR COOLING PURPOSES.
- AERATOR SUPPLY LINE SHALL CONSIST OF STAINLESS STEEL 316 SCH 40. DESIGN ENGINEER SHALL SIZE THE AIR MAIN DISTRIBUTION LINE ACCORDING TO REQUIRED AIR FLOW, BUT IN NO CASE IT SHALL BE SMALLER THAN 2-INCH. THE SUPPLY AIR LINE SHALL BE EMBEDDED IN WET WELL TOP SLAB AND SHALL TERMINATE AT THE WET WELL PUMP ACCESS HATCH OR AT SUPPLEMENTAL SLEEVED PENETRATIONS DEDICATED FOR THE AIR EJECTORS.



SUBMERSIBLE PUMP LIFT STATION TYPICAL SITE LAYOUT

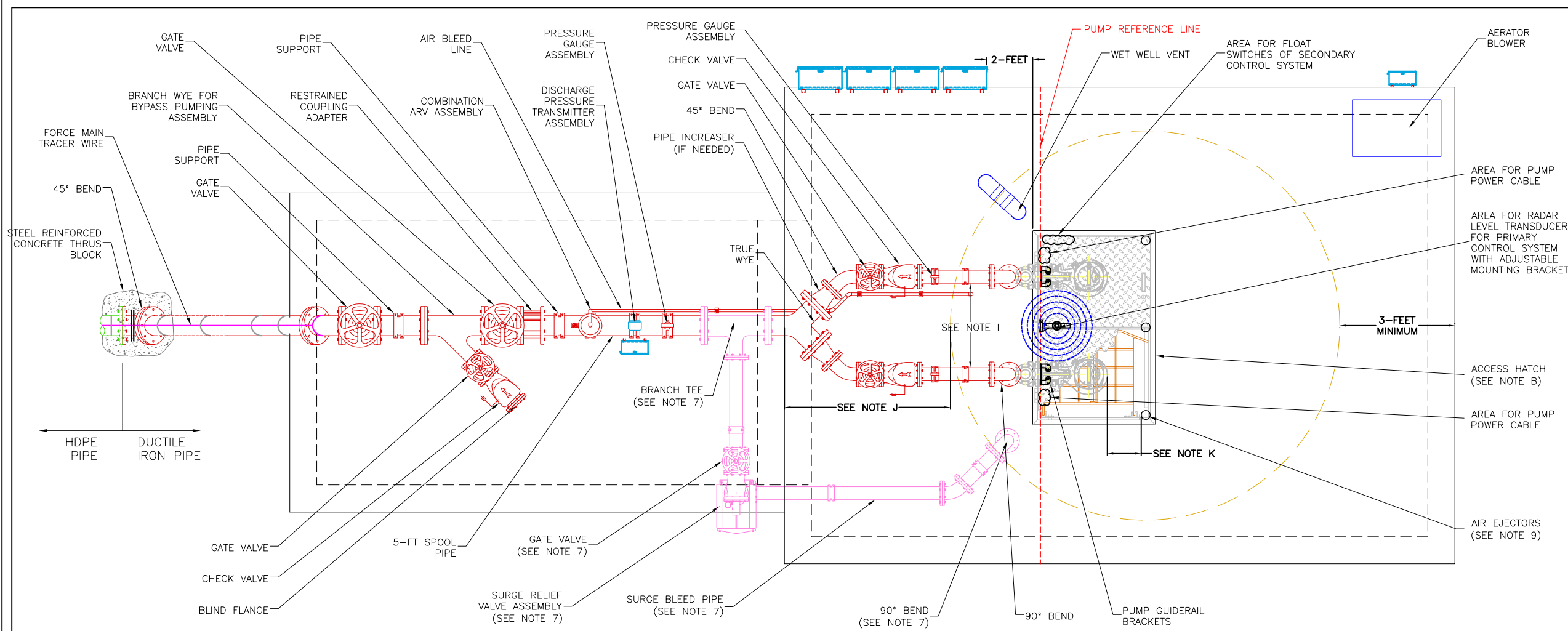
REVISION
JUN 2026

PLANTS AND MAJOR PROJECTS

PROPERTY OF
SAN ANTONIO WATER SYSTEM
SAN ANTONIO, TEXAS

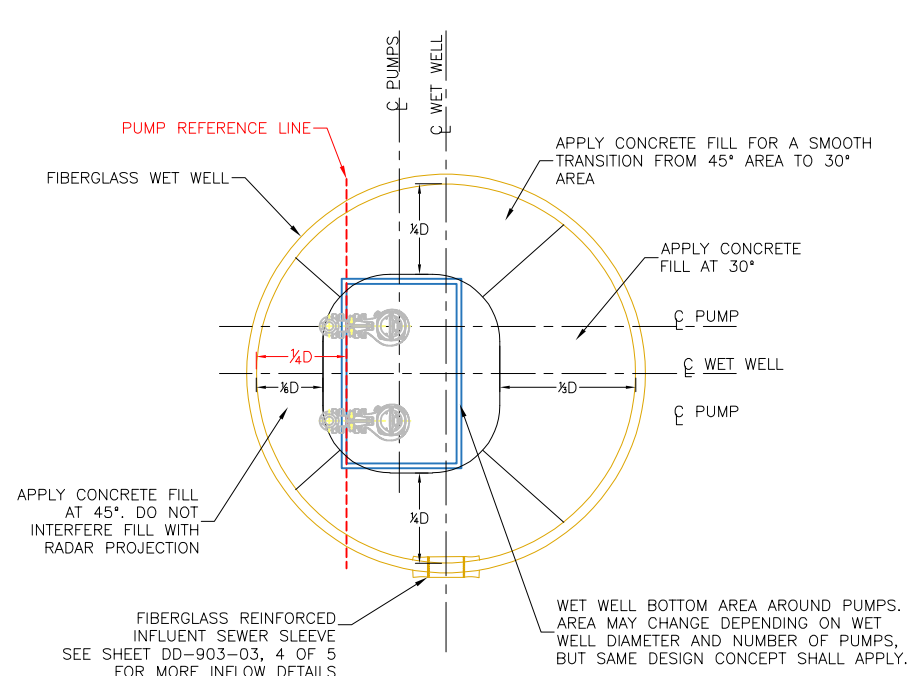
DD-903-01

SHEET
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OF 3



- NOTES TO DESIGN ENGINEER:**
- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE A GUIDE FOR THE CONSTRUCTION OF SAN ANTONIO WATER SYSTEM SUBMERSIBLE PUMP LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. **IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO MODIFY ACCORDINGLY.**
 - B. DESIGN ENGINEER SHALL VERIFY THE SIZE AND LOCATION OF THE WET WELL ACCESS HATCH ACCORDING TO SIZE AND NUMBER OF PUMPS INSTALLED. THE QUANTITY OF AIR EJECTORS AND CONSIDERING SUFFICIENT CLEARANCE FOR ELECTRIC CONDUITS, POWER CABLES AND AERATOR SUPPLY LINES, BUT IN NO CASE SHALL BE SMALLER THAN 36" X 48". SAFETY GRATE SHALL BE OF COATED ALUMINUM AND SHALL HAVE OPENINGS ABOUT 5" X 5". ACCESS HATCH AND SAFETY GRATE SHALL BE FLUSHED WITH WET WELL TOP SLAB. ACCESS HATCH AND SAFETY GRATE SHALL OPEN TOWARDS THE PUMP DISCHARGE LINES. SHALL BE PROVIDED WITH LIFT ASSIST MECHANISM MADE OF STAINLESS STEEL 316. ACCESS HATCH, PUMP DISCHARGE BASES, PUMP DISCHARGE LINES AND GUIDERAIL SYSTEM SHALL BE ALIGNED BASED ON THE PUMP MANUFACTURER REFERENCE LINE.
 - C. ELEVATIONS AND INFORMATION OMITED ARE DETERMINED BY DESIGN ENGINEER FOR SPECIFIC SITE REQUIREMENTS.
 - D. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD DRAWINGS AND DETAILS INTO THE PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCE NOTES ACCORDINGLY.
 - F. THE DESIGN ENGINEER SHALL CONSULT THE SAN ANTONIO WATER SYSTEM LIFT STATION DESIGN AND CONSTRUCTION GUIDELINES AND THE UTILITY SERVICE REGULATIONS MANUAL FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DRAWINGS.
 - G. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE LIFT STATION DESIGN DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.
 - H. REQUIRED FOR ALL STATIONS.
 - I. CLEARANCE BETWEEN PUMP DISCHARGE PIPES SHALL BE DETERMINED BY PROJECTING THE RADAR BEAM TO THE BOTTOM OF THE WET WELL. THE RADAR BEAM SHALL HAVE A CLEAR AND UNOBSTRUCTED PROJECTION TO THE WET WELL FLOOR. ALL PUMP DISCHARGE PIPING MUST HAVE THE SAME CLEARANCE, AND IN NO CASE SHALL THE CLEARANCE BE LESS THAN 2.5 FEET.
 - J. EXTEND THE WET WELL SLAB A MINIMUM OF 4 FEET FROM EDGE OF WET WELL TO ASSURE ALL WET WELL CONDUITS ARE EMBEDDED IN THE TOP SLAB. EXTEND FURTHER WHEN MORE THAN TWO PUMPS ARE INSTALLED.
 - K. MINIMUM CLEARANCE FROM PUMP VOLUTE TO AIR EJECTOR SHALL BE 18 INCHES. DESIGN ENGINEER TO ACCOUNT FOR THIS WHEN SIZING THE PUMP ACCESS HATCHES.

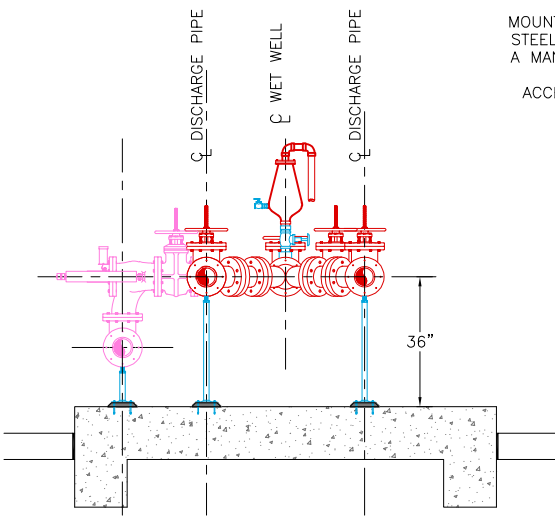
- KEY NOTES:**
- 1. INSTALL RESILIENT WEDGE, FLANGED JOINT GATE VALVES. THE NORMAL INSTALLATION POSITION OF GATE VALVES IS VERTICAL, PROVIDED THE OPERATING HANDLE IS LOCATED AT 60 INCHES OR LESS MEASURED FROM THE SLAB. IF VALVE OPERATING HANDLE IS HIGHER THAN 60 INCHES, THE DESIGN ENGINEER MUST MODIFY THE DISCHARGE HEADER DESIGN TO SHOW THE VALVES INSTALLED IN A HORIZONTAL POSITION.
 - 2. INSTALL SWING TYPE CHECK VALVE WITH EXTERNAL LEVER AND WEIGHT.
 - 3. ALL PUMP DISCHARGE PIPE AND FITTINGS WITHIN WET WELL, EXCEPT SS316 AND PVC, SHALL RECEIVE AFTER INSTALLATION A 100% SOLIDS COAL TAR EPOXY COATING SYSTEM IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS.
 - 4. ALL PUMP DISCHARGE PIPE, VALVES AND FITTINGS OUTSIDE THE WET WELL, EXCEPT SS316 AND PVC, SHALL RECEIVE AFTER INSTALLATION A 100% SOLIDS EPOXY COATING SYSTEM WITH A TOP COAT OF URETHANE IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS. COLOR SHALL BE GREY PANTONE #431-U.
 - 5. DISCHARGE PIPE SUPPORT CHANNEL SHALL BE SIZED TO ALIGN THE GUIDERAIL BRACKETS WITH PUMP REFERENCE LINE. SUPPORT CHANNEL MOUNTING PLATE SHALL BE 12X12-INCH, 1/4-INCH THICK. ALL MATERIALS SHALL BE STAINLESS STEEL 316.
 - 6. INCLUDE ONLY WHEN A SURGE RELIEF VALVE IS REQUIRED.
 - 7. TOP AND INTERMEDIATE GUIDERAIL BRACKETS, SLEEVES AND ALL FASTENERS SHALL BE MADE OF STAINLESS STEEL 316. FOR BRACKETS DIFFERENT THAN THE ONE SHOWN, THE SAME SLEEVE CONCEPT SHALL BE PROVIDED IN THE DESIGN.
 - 8. ALL AIR EJECTORS SHALL BE INSTALLED AT THE SAME ELEVATION AND WITH EQUAL HOSE LENGTH. MAINTAIN A MINIMUM 24-INCH SEPARATION AMONG AIR EJECTORS AND FROM WET WELL WALL. DESIGN ENGINEER SHALL ACCOUNT FOR THIS REQUIREMENT WHEN SIZING THE WET WELL ACCESS HATCH, UNLESS SUPPLEMENTAL ACCESS HATCHES ARE PROVIDED FOR THE AIR EJECTORS. DESIGN ENGINEER SHALL COORDINATE WITH WET WELL AERATION SYSTEM MANUFACTURER TO SIZE THE AERATION SYSTEM.



- NOTES:**
- 1. D = WET WELL DIAMETER.
 - 2. CONCRETE FILL SHALL MEET SANS MANHOLE STANDARDS.
 - 3. DESIGN ENGINEER MUST DESIGN THE FILL FOR DIFFERENT WET WELL SHAPES BUT MAINTAINING THE SAME CONCEPT.

WET WELL SECTION A

WET WELL PLAN NOTE:
THIS DRAWING IS NOT TO SCALE. DESIGN ENGINEER MUST DRAW THE WET WELL PLAN TO SCALE.

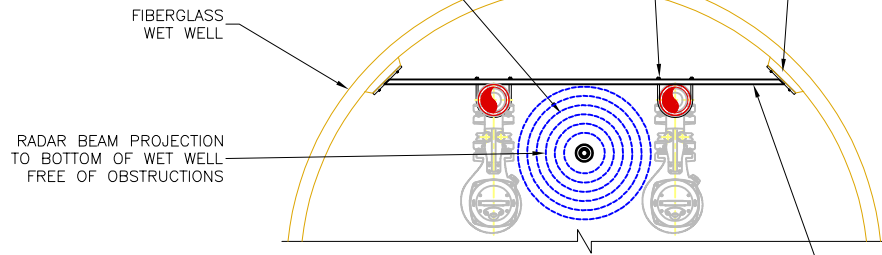


DISCHARGE HEADER SECTION B

REINFORCED FIBERGLASS PLATE BASE DESIGNED BY WET WELL MANUFACTURER. BASE PLATE SHALL BE SIZED TO MATCH THE MOUNTING PLATE. BASE PLATE THICKNESS SHALL BE SUFFICIENT TO RESIST THE FORCES AND VIBRATIONS ASSOCIATED WITH THE LIFT STATION OPERATION AND MAINTENANCE.

FASTEN PUMP DISCHARGE PIPES TO SUPPORT BEAM USING STAINLESS STEEL 316 U-BOLTS 5/8-INCH MINIMUM. PROTECT DISCHARGE PIPE CONTACT SURFACE WITH 1/4-INCH THICK NEOPRENE GASKET TO PREVENT COATING DAMAGE.

MOUNT RADAR TRANSDUCER ONTO AN ADJUSTABLE STAINLESS STEEL 316 BRACKET. INSTALL BRACKET AND ALIGN RADAR IN A MANNER THAT THE PROJECTED RADAR BEAM REACHED THE BOTTOM OF THE WET WELL WITHOUT ANY OBSTRUCTION. ACCESS HATCH AND SAFETY GRATE MUST CLOSE PROPERLY WITHOUT INTERFERING WITH THE RADAR SYSTEM.

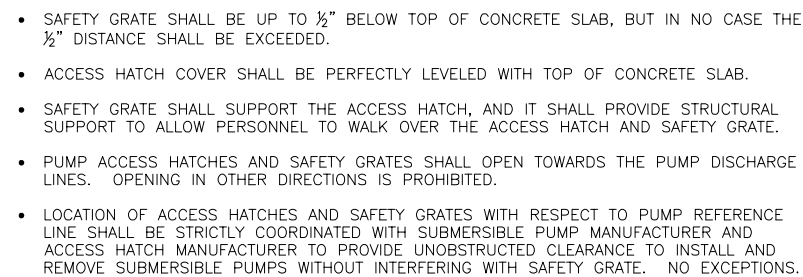


WET WELL DISCHARGE PIPE SUPPORT BEAM WELDED TO WALL MOUNTING PLATES. FASTEN MOUNTING PLATES TO WET WELL REINFORCED FIBERGLASS BASE PLATES, USING PROPERLY SIZED FASTENING BOLTS, WASHERS AND LOCK NUTS. MOUNTING PLATE AND ALL FASTENERS SHALL BE STAINLESS STEEL 316.

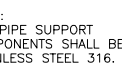
DISCHARGE PIPE SUPPORT DETAIL C

	SUBMERSIBLE LIFT STATION CONFIGURATION PLAN VIEW	
	REVISION JUN 2026	PLANTS AND MAJOR PROJECTS
	PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	
DD-903-01		SHEET 2 OF 3

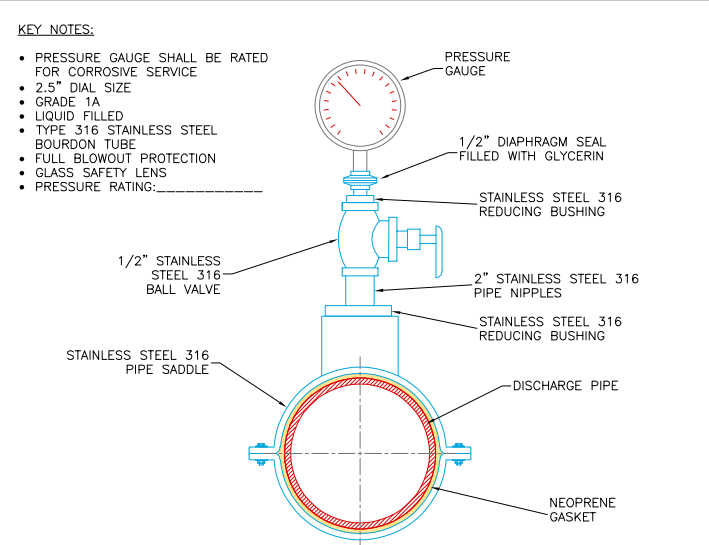




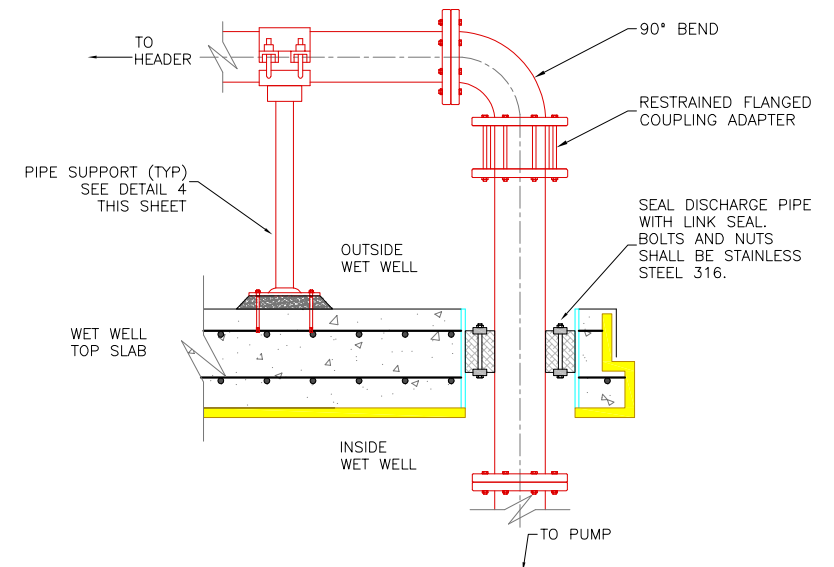
DETAIL 1:
ACCESS HATCH AND
SAFETY GRATE DETAIL



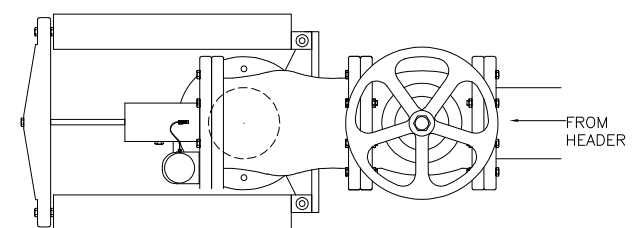
DETAIL 2:
PIPE SUPPORT DETAILS



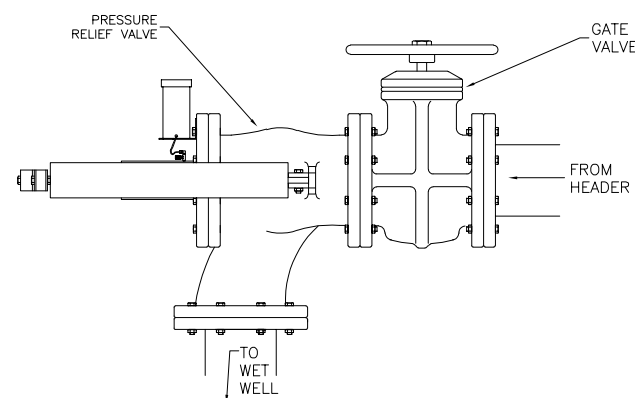
DETAIL 3:
PRESSURE GAUGE INSTALLATION DETAIL



DETAIL 5:
DISCHARGE PIPE PENETRATION DETAIL



PLAN VIEW

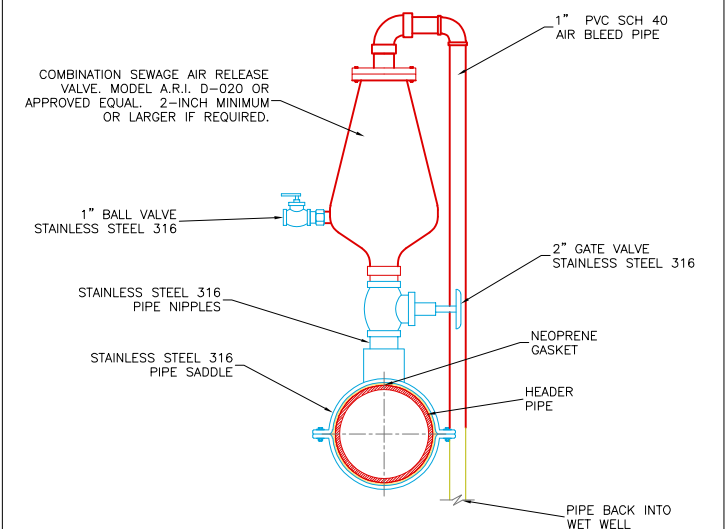


PROFILE VIEW

FIRM PUMPING CAPACITY FLOW (GPM): _____
 VALVE SIZE (INCHES): _____
 DISCHARGE PRESSURE AT HEADER (PSI): _____
 SURGE PRESSURE AT HEADER (PSI): _____
 VALVE OPEN SETTING (PSI): _____

VALVE OPEN SETTING IS ESTIMATED. VALVE MANUFACTURER
REPRESENTATIVE SHALL ADJUST THE VALVE DURING STARTUP AND TESTING

DETAIL 4:
PRESSURE RELIEF VALVE MOUNTING DETAIL



DETAIL 6:
AIR RELEASE VALVE INSTALLATION DETAIL AT HEADER



REVISION
JUN 2026

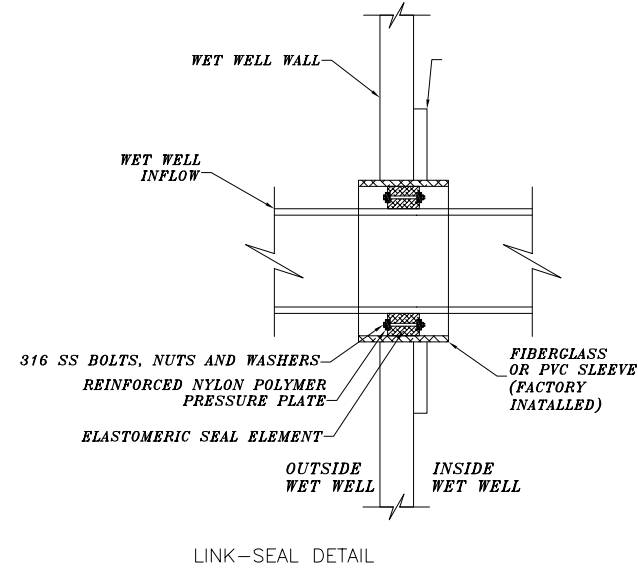
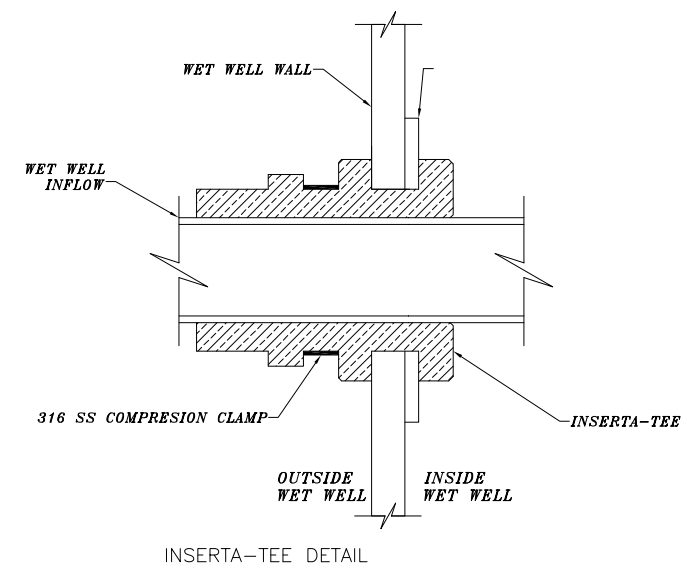
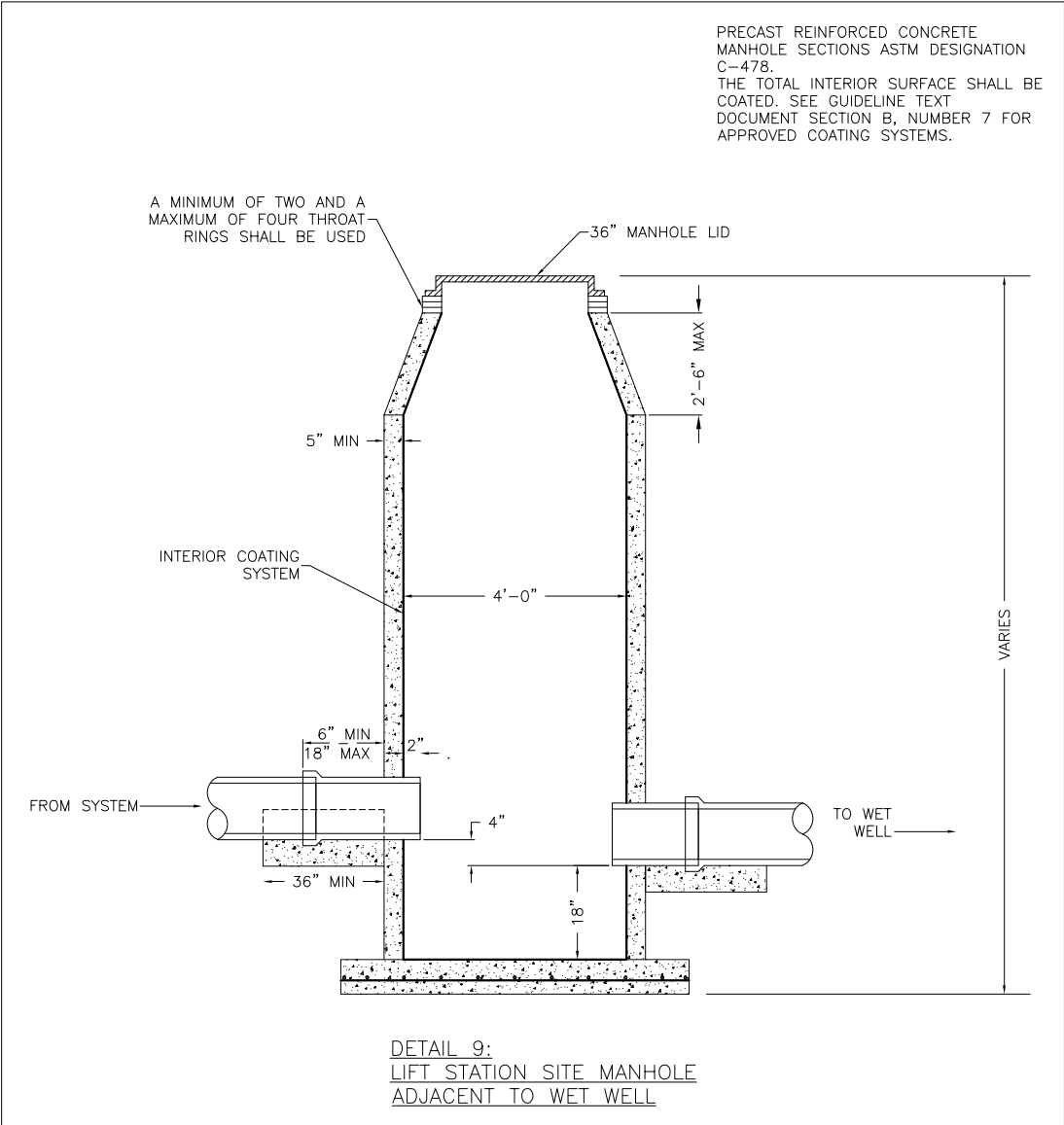
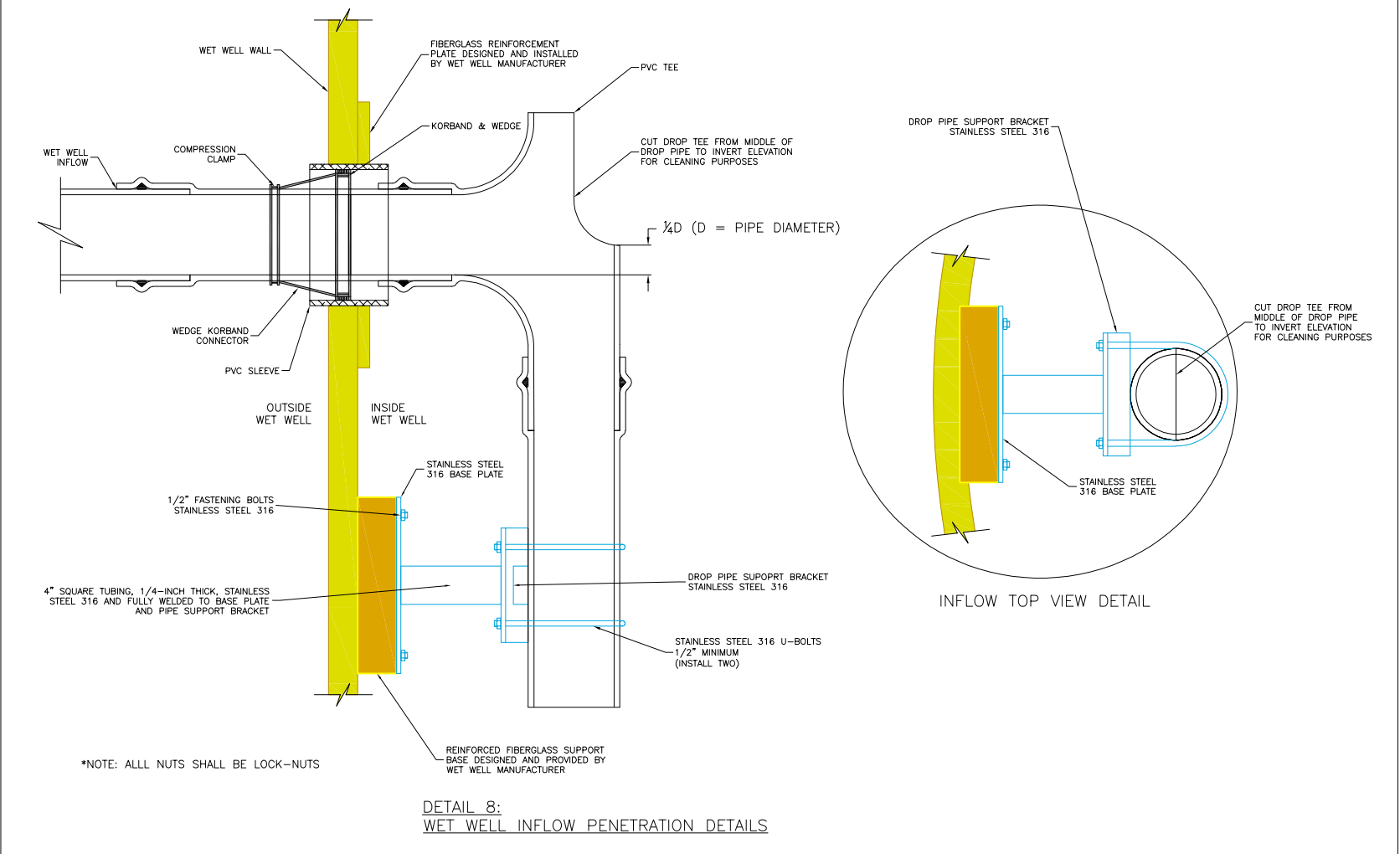
WET WELL AND PIPING DETAILS

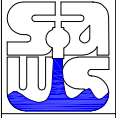
PLANTS AND MAJOR PROJECTS

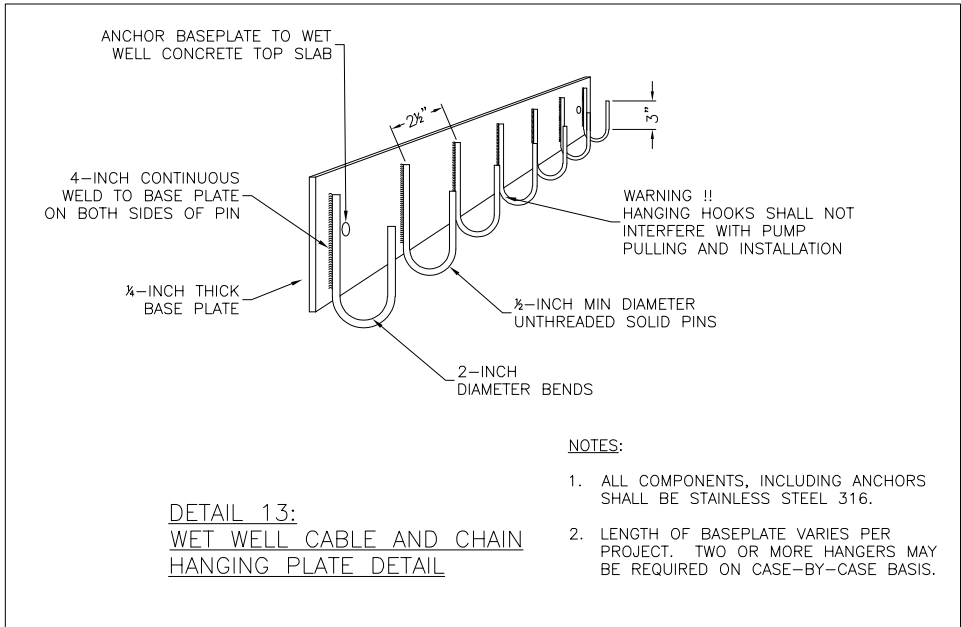
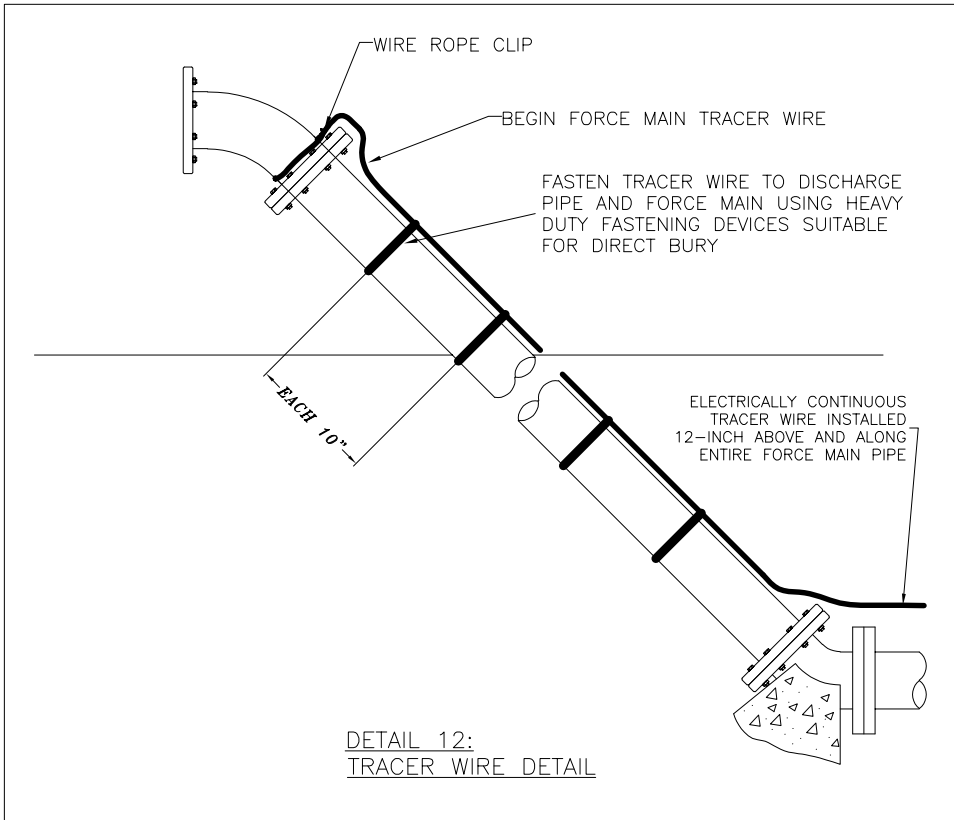
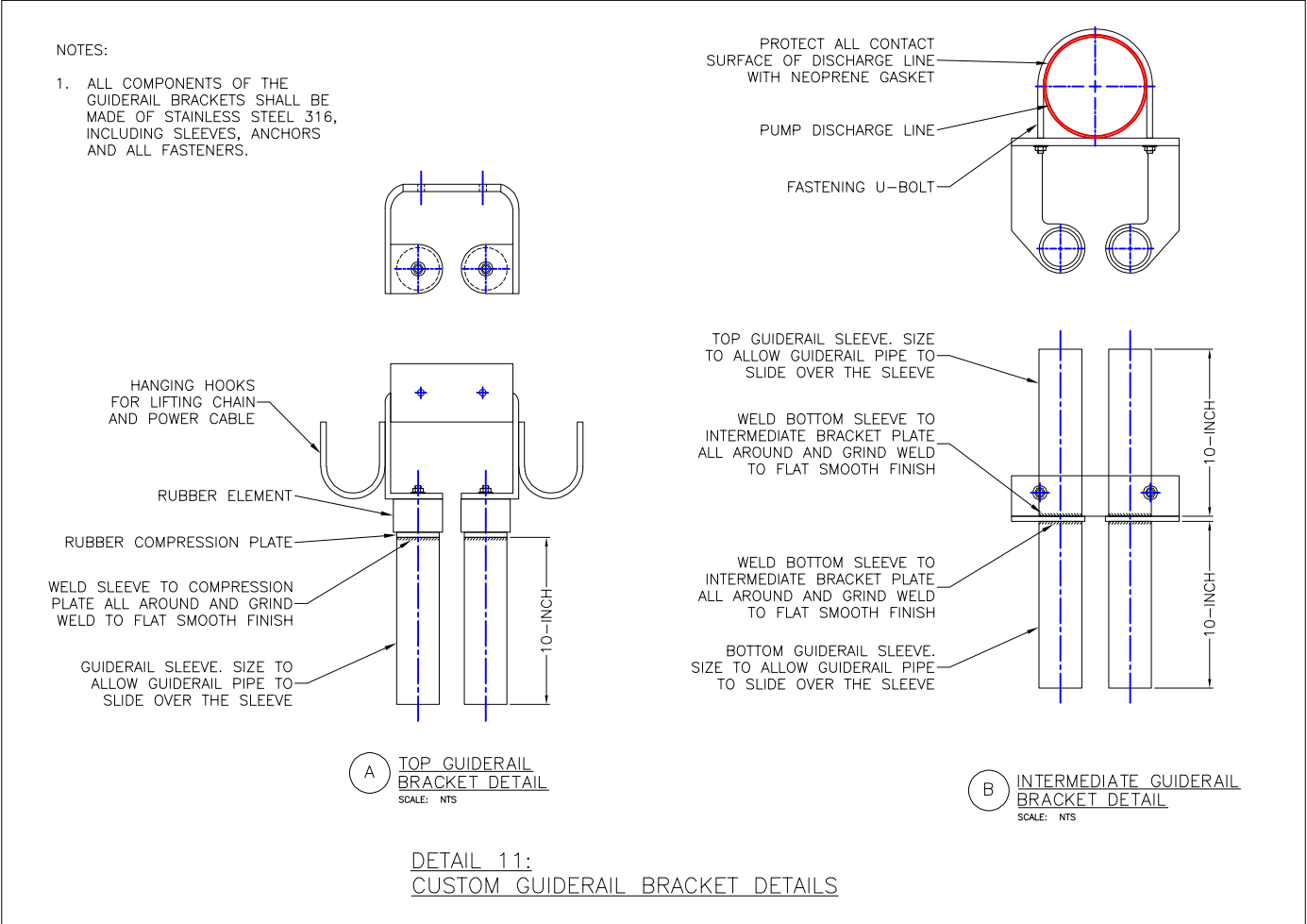
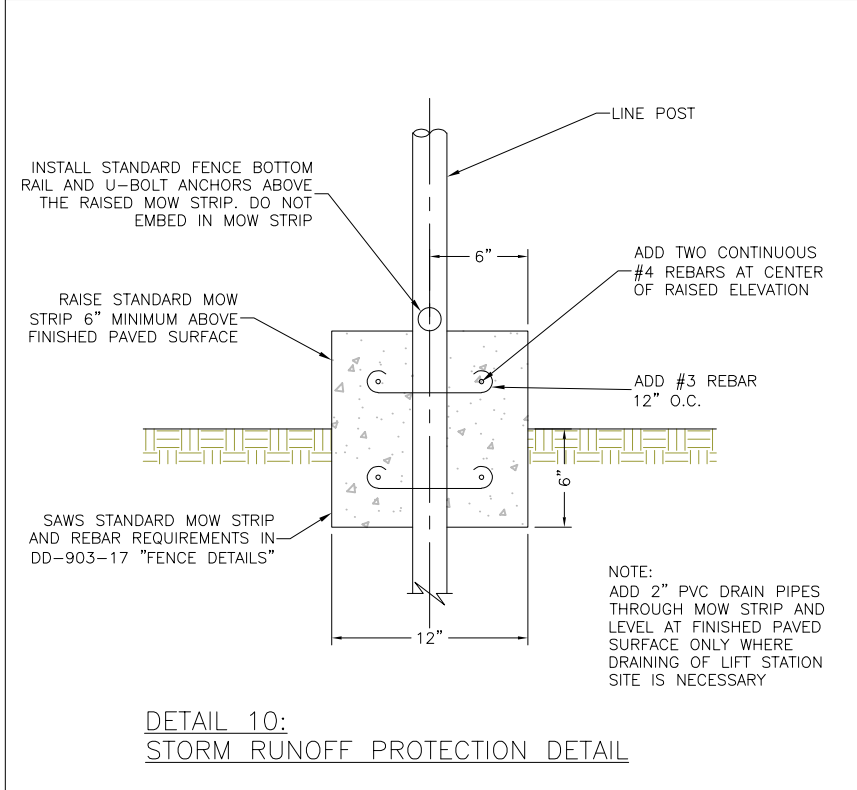
PROPERTY OF
SAN ANTONIO WATER SYSTEM
SAN ANTONIO, TEXAS

DD-903-02

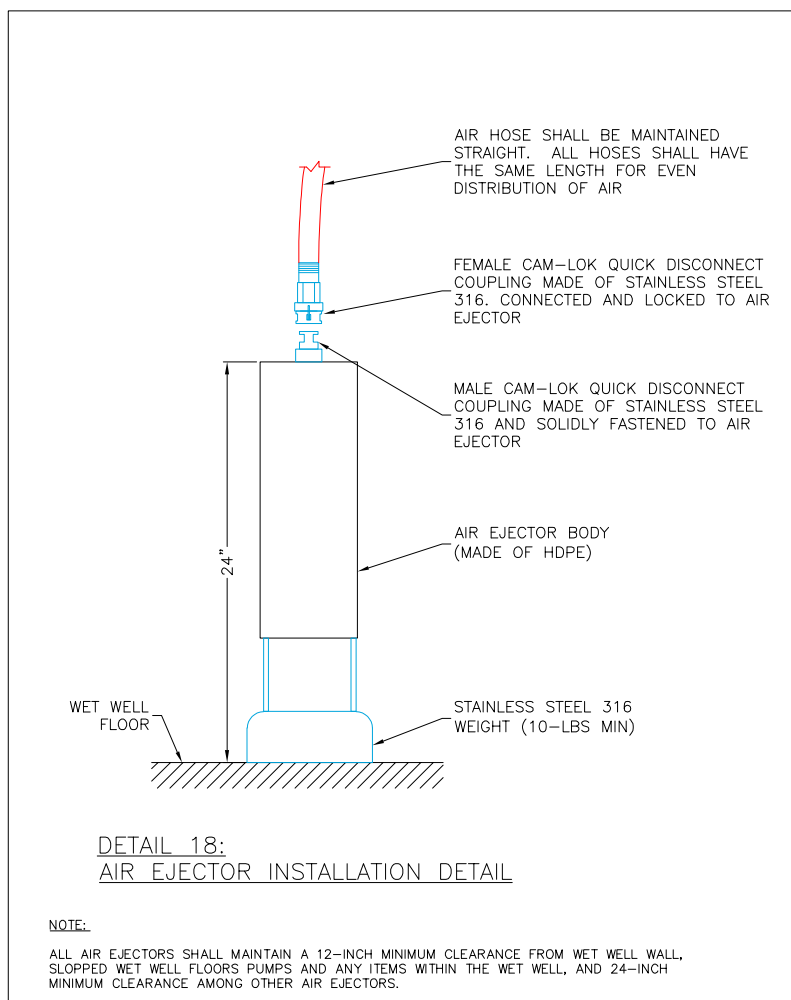
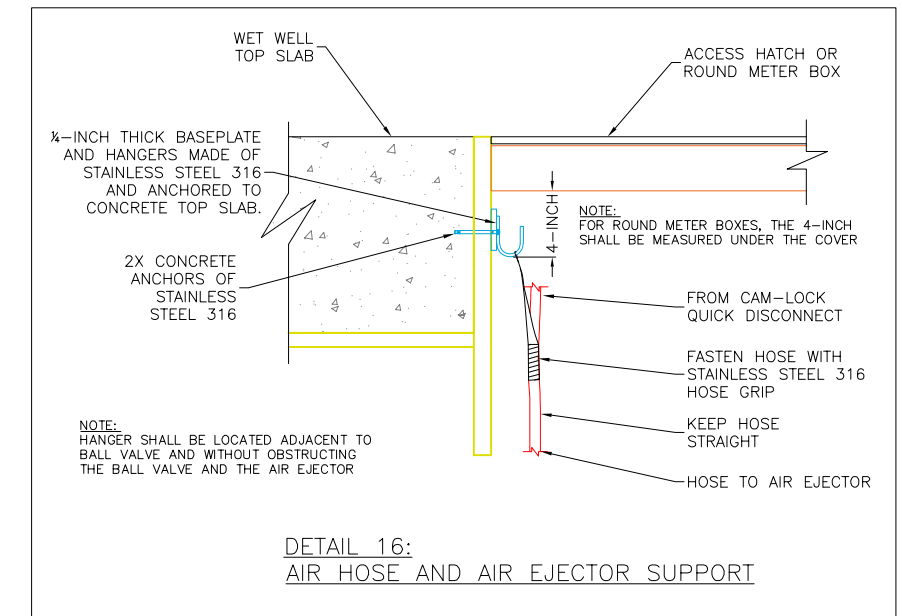
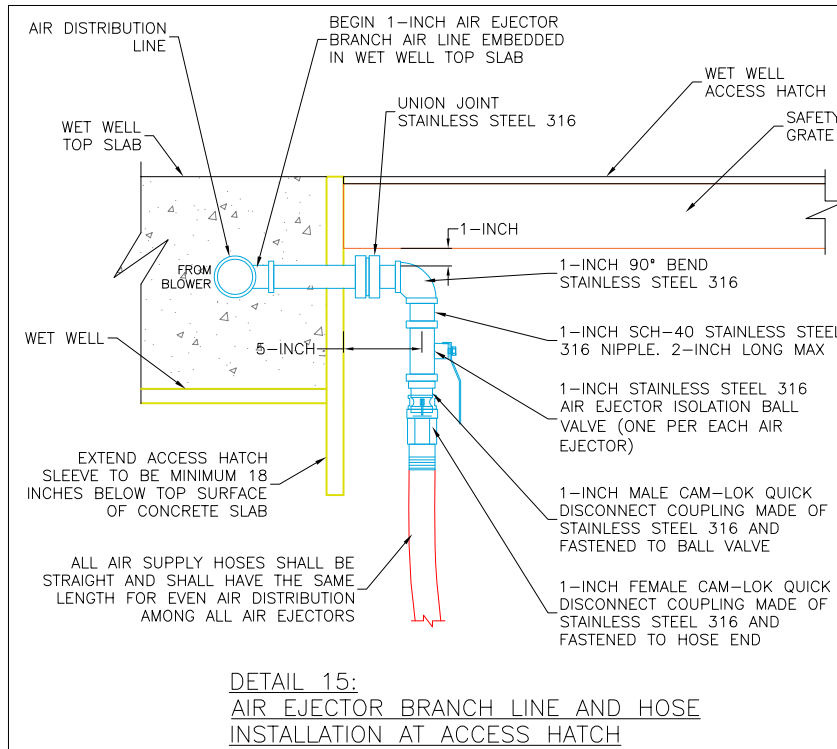
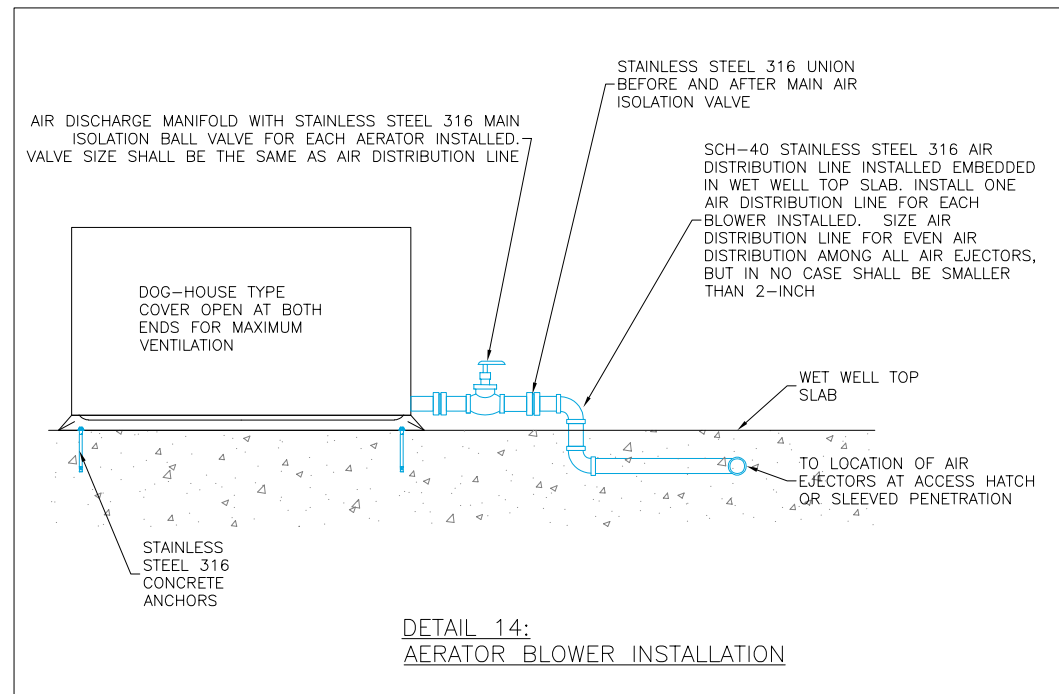
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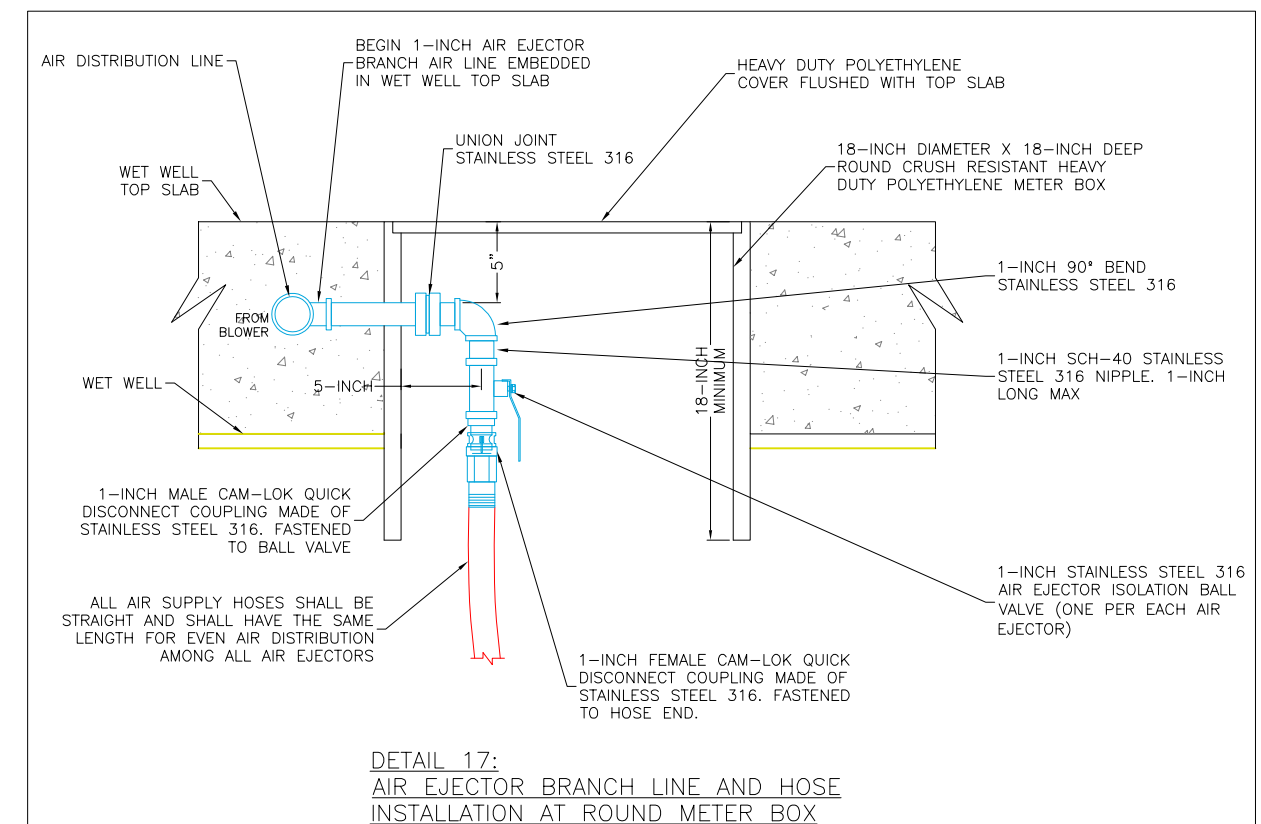
	WET WELL INFLOW AND ON-SITE MANHOLE	
	REVISION JUN 2026	PLANTS AND MAJOR PROJECTS
	PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	
	DD-903-02	SHEET 3 OF 5



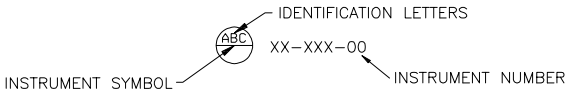
	MISCELLANEOUS DETAILS	
	REVISION JUN 2026	PLANTS AND MAJOR PROJECTS
	PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	
	DD-903-02	SHEET 4 OF 5



- NOTES:
1. DESIGN ENGINEER SHALL COORDINATE THE DESIGN OF THE WET WELL TOP SLAB WITH THE AERATOR SYSTEM MANUFACTURER, THE ELECTRICAL AND STRUCTURAL ENGINEERS, AND WITH SAWS.
 2. WHERE POSSIBLE, AIR EJECTORS SHALL TERMINATE AT ACCESS HATCHES. ANY AIR EJECTOR THAT CANNOT TERMINATE AT A WET WELL ACCESS HATCH SHALL TERMINATE AT A DEDICATED HEAVY DUTY POLYETHYLENE ROUND METER BOX 18-INCH DIAMETER AND 18-INCH DEEP, AND COVER SHALL BE SET FLUSHED WITH THE TOP SLAB SURFACE.
 3. THE LOCATION OF ALL AIR EJECTORS AND ASSOCIATED BRANCH LINES, VALVES, FITTINGS, HOSES AND HANGERS SHALL BE LOCATED IN A DEDICATED AREA THAT IS FREE OF CONDUITS, CABLES, LIFTING CHAINS, TRANSDUCERS, GUIDERAILS, AND BE SET IN A MANNER THAT NO OBSTRUCTION WILL OCCUR WHEN INSTALLING AND REMOVING PUMPS, FLOATS AND AIR EJECTORS. THE HOSES MUST BE SUSPENDED IN A MANNER THAT THEY DO NOT OBSTRUCT THE PROJECTION OF THE RADAR BEAM.
 4. ALL PIPING, VALVES AND FITTINGS USED FOR BOTH AIR DISTRIBUTION LINES AND AIR EJECTOR BRANCH LINES SHALL BE SCHEDULE 40, THREADED AND BE MADE OF STAINLESS STEEL 316.
 5. ALL ANCHOR BOLTS, STRUT CHANNELS, PIPE CLAMPS AND FASTENERS USED FOR INSTALLATION OF THE AERATOR SYSTEM SHALL BE MADE OF STAINLESS STEEL 316.
 6. ALL THREADED JOINTS SHALL BE SEALED WITH SUFFICIENT TEFLON TAPE TO PREVENT AIR LEAK.
 7. THE HANGER FOR HOSE SHALL BE SET IN A MANNER THAT THE AIR HOSE IS MAINTAINED STRAIGHT AND WITHOUT BENDS. ALL HOSES SHALL HAVE THE SAME LENGTH.



SYMBOLS	INSTRUMENT SYMBOLS	ABBREVIATION INDEX
 SWING CHECK VALVE  GATE VALVE  PUMP	 FIT FIELD MOUNTED INSTRUMENT  YL LOCAL CONTROL PANEL MOUNTED INSTRUMENT  YL POINT MONITORED BY SCADA	CR CONTROL RELAY EMT ELAPSED TIME METER HOA HAND-OFF-AUTO SWITCH HTR HIGH TEMPERATURE RELAY ILP INFLUENT LIFT PUMP LDR LEAK DETECTION RELAY LOC/REM LOCAL-REMOTE SWITCH LR LEVEL RELAY LS LIFT STATION OL MOTOR OVERLOAD OT OVERTEMPERATURE PFR PHASE FAILURE RELAY PR MOTOR FAILURE RELAY SL SEAL LEAK SS START-STOP STATION TFR TRANSFER FAIL RELAY TI TEMPERATURE INDICATOR TR TIMING RELAY
	INSTRUMENT IDENTIFICATION	
	LIC LEVEL INDICATING CONTROLLER PIT PRESSURE INDICATING TRANSMITTER LIC LEVEL ALARM HIGH	



INSTRUMENTATION IDENTIFICATION LEGEND				
LETTER	PROCESS OR INITIATING VALUE	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (*)	ALARM		
B	BURNER FLAME	USERS CHOICE (*)	USERS CHOICE (*)	USERS CHOICE (*)
C	CONDUCTIVITY		CONTROL	
D	DENSITY (3.0)			
E	VOLTAGE	PRIMARY ELEMENT		
F	FLOW RATE			
G	GAUGE	GLASS	GATE	
H	HAND (MANUAL)			HIGH
I	CURRENT	INDICATE		
J	POWER			
K	TIME OR SCHEDULE		CONTROL STATION	
L	LEVEL	LIGHT (PILOT)		LOW
M	MOTION			MIDDLE
N	USERS CHOICE (*)	USERS CHOICE (*)	USERS CHOICE (*)	USERS CHOICE (*)
O	USERS CHOICE (*)	ORIFICE		
P	PRESSURE (OR VACUUM)	POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT	INTEGRATE		
R		RECORD OR PRINT		
S	SPEED OR FREQUENCY		SWITCH	
T	TEMPERATURE		TRANSMIT	
U	MULTIVARIABLE (*)	MULTIFUNCTION (*)	MULTIFUNCTION (*)	MULTIFUNCTION (*)
V	VISCOSITY		VALVE OR DAMPER	
W	WEIGHT OR FORCE	WELL		
X	UNCLASSIFIED (*)	UNCLASSIFIED (*)	UNCLASSIFIED (*)	UNCLASSIFIED (*)
Y	USERS CHOICE (*)		RELAY OR COMPUTE (*)	
Z	POSITION		DRIVE ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS.

	LIFT STATION P & ID LEGEND
REVISION JUN 2026	PLANTS AND MAJOR PROJECTS
PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	
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ELECTRICAL LEGEND																																																																					
ELECTRICAL SYMBOLS		SWITCHGEAR / MCC SYMBOLS																																																																			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION																																																																		
	CONVENIENCE RECEPTACLE--DUPLEX UNLESS SPECIFIED OTHERWISE C = CLOCK HANGER CR = CORROSION RESISTANT EWC = WATER COOLER TL = TWIST LOCK WP = WEATHERPROOF GFI = GROUND FAULT INTERRUPTER		SOLID STATE OVERLOAD RELAY MOTOR OVERLOAD, PHASE LOSS, AND CURRENT UNBALANCE PROTECTION																																																																		
	RECEPTACLE - 240V., 10 OR 208V., 10		ELECTRICAL ABBREVIATIONS																																																																		
	CONTACT - NORMALLY OPEN	<table><tr><td>AUTO</td><td>AUTOMATIC</td></tr><tr><td>AUX</td><td>AUXILIARY</td></tr><tr><td>CC</td><td>CONTROL CABLE</td></tr><tr><td>CPT</td><td>CONTROL POWER TRANSFORMER</td></tr><tr><td>CR</td><td>CONTROL RELAY</td></tr><tr><td>CS</td><td>CONTROL SWITCH</td></tr><tr><td>CT</td><td>CURRENT TRANSFORMER</td></tr><tr><td>EI</td><td>ELECTRICAL INTERRUPT</td></tr><tr><td>ETM</td><td>ELAPSED TIME METER</td></tr><tr><td>FLA</td><td>FULL LOAD AMPERE</td></tr><tr><td>FU</td><td>FUSE</td></tr><tr><td>FVNR</td><td>FULL VOLTAGE NON--REVERSING</td></tr><tr><td>HOA</td><td>HAND OFF AUTOMATIC SWITCH</td></tr><tr><td>ISW</td><td>ISOLATION SWITCH</td></tr><tr><td>JJB</td><td>JUNCTION BOX</td></tr><tr><td>KVA</td><td>KILOVOLT--AMPERE</td></tr><tr><td>KW</td><td>KILOWATT</td></tr><tr><td>LS,LMS</td><td>LIMIT SWITCH</td></tr><tr><td>G</td><td>GREEN INDICATING LIGHT</td></tr><tr><td>M</td><td>MAGNETIC CONTACTOR COIL</td></tr><tr><td>M</td><td>ELECTRIC MOTOR</td></tr><tr><td>M</td><td>MAIN CONTACTOR AUXILIARY</td></tr><tr><td>MIN</td><td>MINUTES</td></tr><tr><td>MTS</td><td>MANUAL TRANSFER SWITCH</td></tr><tr><td>N</td><td>NEUTRAL GROUNDED CONDUCTOR</td></tr><tr><td>OB</td><td>OUTBOARD</td></tr><tr><td>OC</td><td>OVERCURRENT</td></tr><tr><td>PH</td><td>PHASE</td></tr><tr><td>SA</td><td>SURGE ARRESTOR</td></tr><tr><td>SEC</td><td>SECONDS</td></tr><tr><td>TR</td><td>TIMER</td></tr><tr><td>V</td><td>VOLT</td></tr><tr><td>XFMR</td><td>TRANSFORMER</td></tr></table>		AUTO	AUTOMATIC	AUX	AUXILIARY	CC	CONTROL CABLE	CPT	CONTROL POWER TRANSFORMER	CR	CONTROL RELAY	CS	CONTROL SWITCH	CT	CURRENT TRANSFORMER	EI	ELECTRICAL INTERRUPT	ETM	ELAPSED TIME METER	FLA	FULL LOAD AMPERE	FU	FUSE	FVNR	FULL VOLTAGE NON--REVERSING	HOA	HAND OFF AUTOMATIC SWITCH	ISW	ISOLATION SWITCH	JJB	JUNCTION BOX	KVA	KILOVOLT--AMPERE	KW	KILOWATT	LS,LMS	LIMIT SWITCH	G	GREEN INDICATING LIGHT	M	MAGNETIC CONTACTOR COIL	M	ELECTRIC MOTOR	M	MAIN CONTACTOR AUXILIARY	MIN	MINUTES	MTS	MANUAL TRANSFER SWITCH	N	NEUTRAL GROUNDED CONDUCTOR	OB	OUTBOARD	OC	OVERCURRENT	PH	PHASE	SA	SURGE ARRESTOR	SEC	SECONDS	TR	TIMER	V	VOLT	XFMR	TRANSFORMER
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	THERMAL OVERLOAD HEATER - AMBIENT COMPENSATED																																																																				
	CIRCUIT BREAKER - THERMAL MAGNETIC 3 POLE UNLESS INDICATED OTHERWISE CONTINUOUS AMP TRIP SETTING INDICATED																																																																				
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	FUSED SWITCH - SWITCH AND FUSE CURRENT RATING INDICATED. 3 POLE UNLESS INDICATED OTHERWISE.																																																																				
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	FUSED TERMINAL BLOCK																																																																				
	ALARM HORN AND BEACON																																																																				
	SELECTOR SWITCH--MAINTAINED CONTACT. CHART DEFINES OPERATION: <table><tr><th colspan="4">POSITION</th></tr><tr><th>POLE</th><th>HAND</th><th>OFF</th><th>AUTO</th></tr><tr><td>1</td><td>X</td><td>0</td><td>0</td></tr><tr><td>2</td><td>0</td><td>0</td><td>X</td></tr></table> X = CLOSED CONTACT 0 = OPEN CONTACT	POSITION				POLE	HAND	OFF	AUTO	1	X	0	0	2	0	0	X																																																				
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	GROUND																																																																				
	TRANSFORMER																																																																				
	MOTOR, SQUIRREL CAGE INDUCTION--HORSEPOWER INDICATED ON ONE LINE.																																																																				
	LUMINAIRE, TYPE AS NOTED																																																																				
	INDICATING LIGHT--PUSH TO TEST (PTT) LETTER INDICATES COLOR. A = AMBER Y = YELLOW G = GREEN B = BLUE R = RED W = WHITE																																																																				
	MOTOR OR STARTER ENCLOSURE SPACE HEATER																																																																				
	BASIC RELAY SYMBOL--SOME RELAY FUNCTIONS: ALT = ALTERNATOR CR = CONTROL RELAY TR = TIMING RELAY M = MOTOR CONTACTOR																																																																				
	THERMOSTAT																																																																				
	LEVEL FLOAT																																																																				
	GROUNDING CONNECTION EXOTHERMIC																																																																				
	GATE FLEXIBLE GROUNDING STRAP.																																																																				
	GROUND ROD CONNECTION 5/8" X 8' LONG.																																																																				
	TEST WELL WITH GROUND ROD CONNECTION 5/8" X 8' LONG.																																																																				
	ABOVE GRADE TAIL FOR EQUIPMENT CONNECTION. TO BE LOCATED FOR PROPER EQUIPMENT ENTRANCE. PENETRATION THRU CONCRETE TO HAVE SCHEDULE 80 PVC PIPE SEGMENT.																																																																				
	MOISTURIZING PORT																																																																				



ELECTRICAL LEGEND

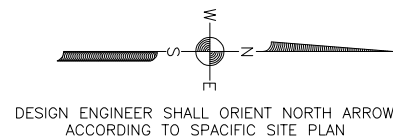
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PLANTS AND MAJOR PROJECTS

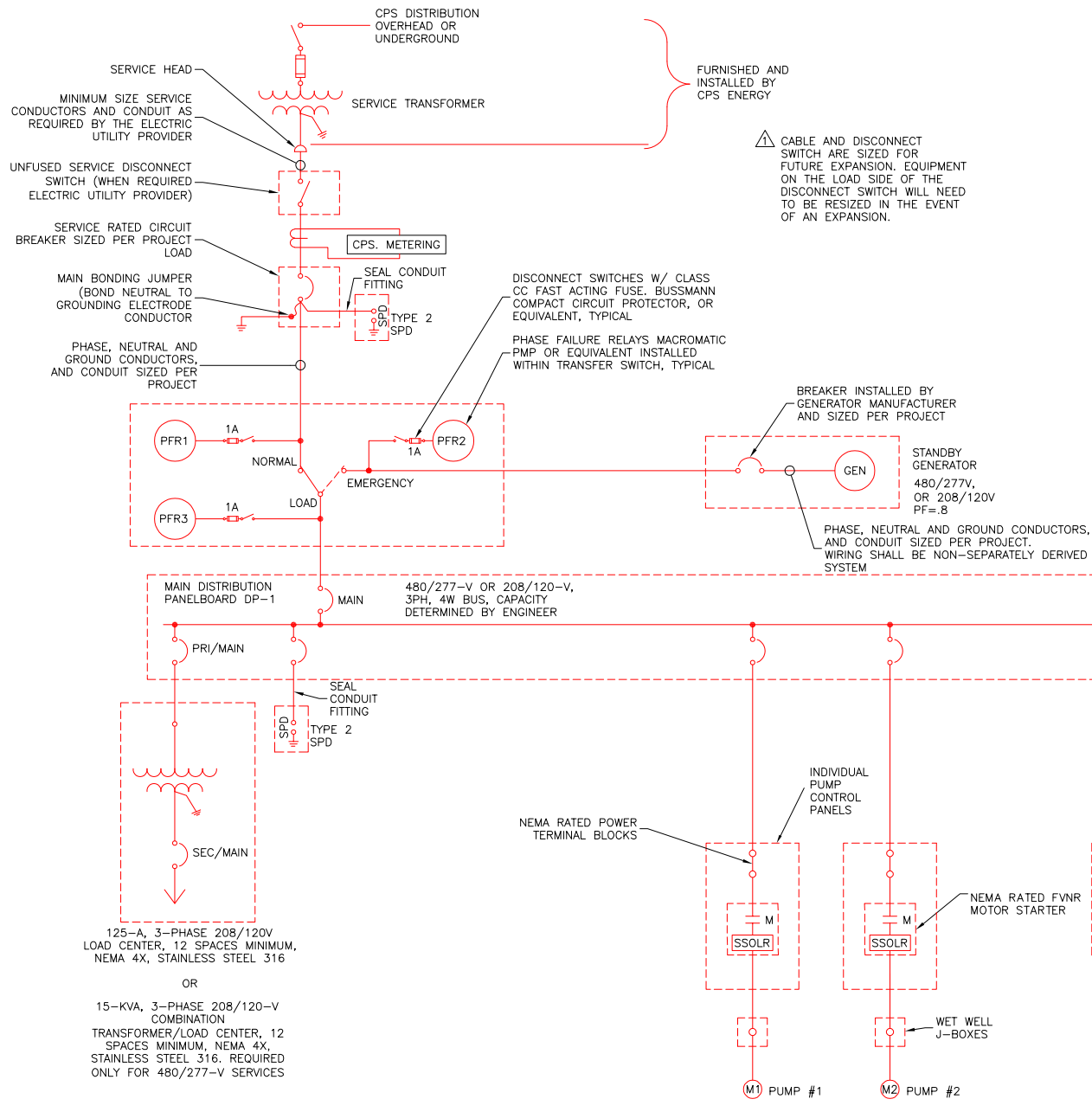
PROPERTY OF
SAN ANTONIO WATER SYSTEM
SAN ANTONIO, TEXAS

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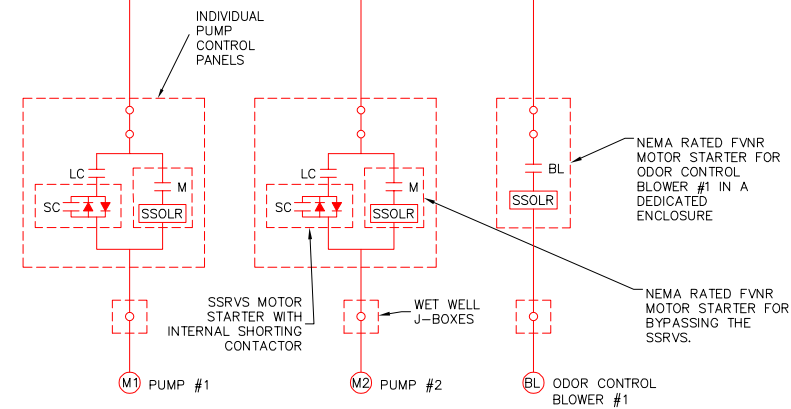


SHEET
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OF 19



NOTES:

1. SERVICE SHALL BE 3-PHASE, 4-WIRE, 60-HZ. THE VOLTAGE SYSTEM SHALL BE 480Y/277-VOLT WHEN THE TOTAL CONNECTED LOAD IS 45-KVA AND GREATER. FOR TOTAL CONNECTED LOADS OF LESS THAN 45-KVA, THE VOLTAGE SYSTEM SHALL BE 208Y/120-VOLT.
2. SERVICE SHALL BE SIZED ACCORDING TO THE REQUIREMENTS OF THE ELECTRIC UTILITY PROVIDER. DESIGN ENGINEER MUST VERIFY IF THE ELECTRIC UTILITY PROVIDER WILL REQUIRE AN NON-FUSED SERVICE RATED DISCONNECT SWITCH ON THE LINE SIDE OF THE POWER METER. IF REQUIRED, IT MUST BE INCLUDED IN THE DESIGN AS SHOWN IN THIS SHEET.
3. THE MAIN SERVICE AND MAIN GENERATOR DISCONNECT, OVERCURRENT AND FAULT PROTECTION SHALL CONSIST OF A MOLDED CASE CIRCUIT BREAKER WITH ELECTRONIC TRIP UNIT THAT PROVIDES ADJUSTABLE SETTINGS FOR LONG DELAY TRIP, SHORT DELAY TRIP, AND INSTANTANEOUS TRIP.
4. AUTOMATIC TRANSFER SWITCH SHALL HAVE A COMMON SOLID NEUTRAL CONDUCTOR TO THE GENERATOR AND SERVICE.
5. THE ENCLOSURE OF THE TRANSFER SWITCH SHALL BE LARGE ENOUGH TO ALLOW THE INTERNAL INSTALLATION OF THREE A PHASE LOSS RELAYS (NORMAL SIDE, EMERGENCY SIDE, AND LOAD SIDE) AND THEIR ASSOCIATED COMPACT CIRCUIT PROTECTORS. THESE PHASE LOSS RELAYS ARE TO PROVIDE SCADA INDICATION.
6. MAIN POWER DISTRIBUTION PANELBOARD SHALL BE OF THE BOLTED TYPE CIRCUIT BREAKERS. THE MAIN AND ALL BRANCH BREAKERS SHALL CONSIST OF MOLDED CASE CIRCUIT BREAKERS WITH ELECTRONIC TRIP UNITS THAT PROVIDE ADJUSTABLE SETTINGS FOR LONG DELAY TRIP, SHORT DELAY TRIP, AND INSTANTANEOUS TRIP.
7. ALL SOLID STATE REDUCED VOLTAGE STARTERS (SSRVS) SHALL HAVE INTEGRATED SHORTING CONTACTOR, OVERLOAD PROTECTION CAPABILITY, AND SHALL BE PROVIDED WITH A LINE CONTACTOR.
8. WHEN SOFT STARTERS ARE REQUIRED, A PARALLEL FULL VOLTAGE STARTER (FVS) SHALL BE PROVIDED TO BYPASS THE SOFT STARTER ASSEMBLY. BOTH THE SOFT STARTER ASSEMBLY AND THE BYPASS STARTER SHALL BE LOCATED WITHIN A SINGLE ENCLOSURE. ONE ENCLOSURE IS REQUIRED PER EACH MOTOR INSTALLED.
9. DESIGN ENGINEER SHALL SIZE ALL THE CONDUCTORS ACCOUNTING AMPACITY CORRECTION FACTORS APPLICABLE FOR LOCAL AMBIENT WEATHER AND NUMBER OF CURRENT CARRYING CONDUCTORS PER PHASE.



USE THIS SEGMENT WHEN FULL VOLTAGE STARTERS ARE ACCEPTABLE. EXPAND DIAGRAM PROPERLY IF ADDITIONAL PUMPS AND ODOR CONTROL BLOWERS ARE REQUIRED.

USE THIS SEGMENT WHEN SOLID STATE REDUCED VOLTAGE STARTERS ARE REQUIRED. EXPAND DIAGRAM PROPERLY IF ADDITIONAL PUMPS AND ODOR CONTROL BLOWERS ARE REQUIRED.



ONE-LINE DIAGRAM

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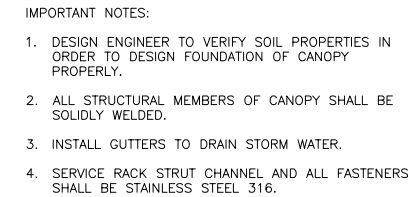
PLANTS AND MAJOR PROJECTS

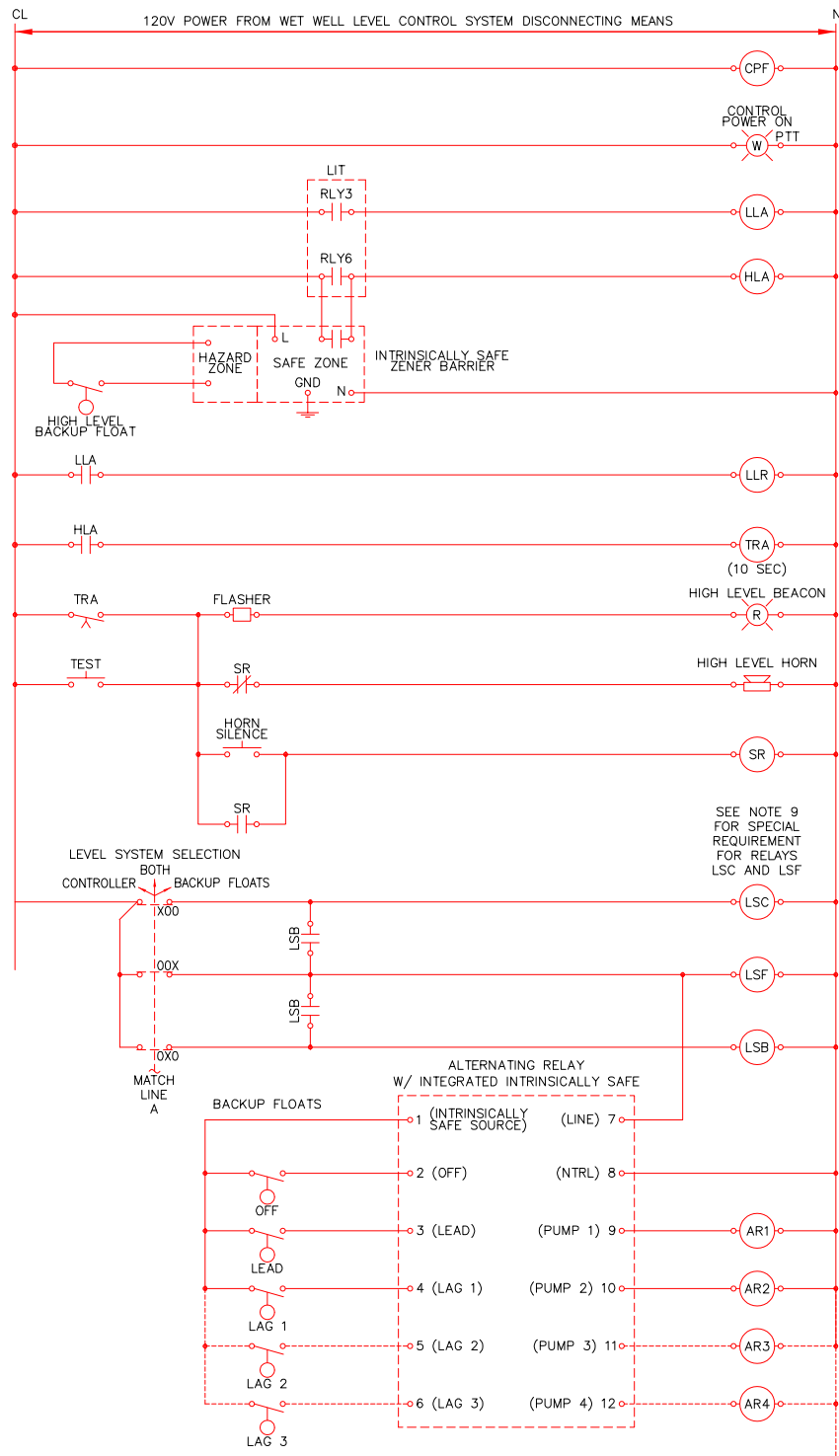
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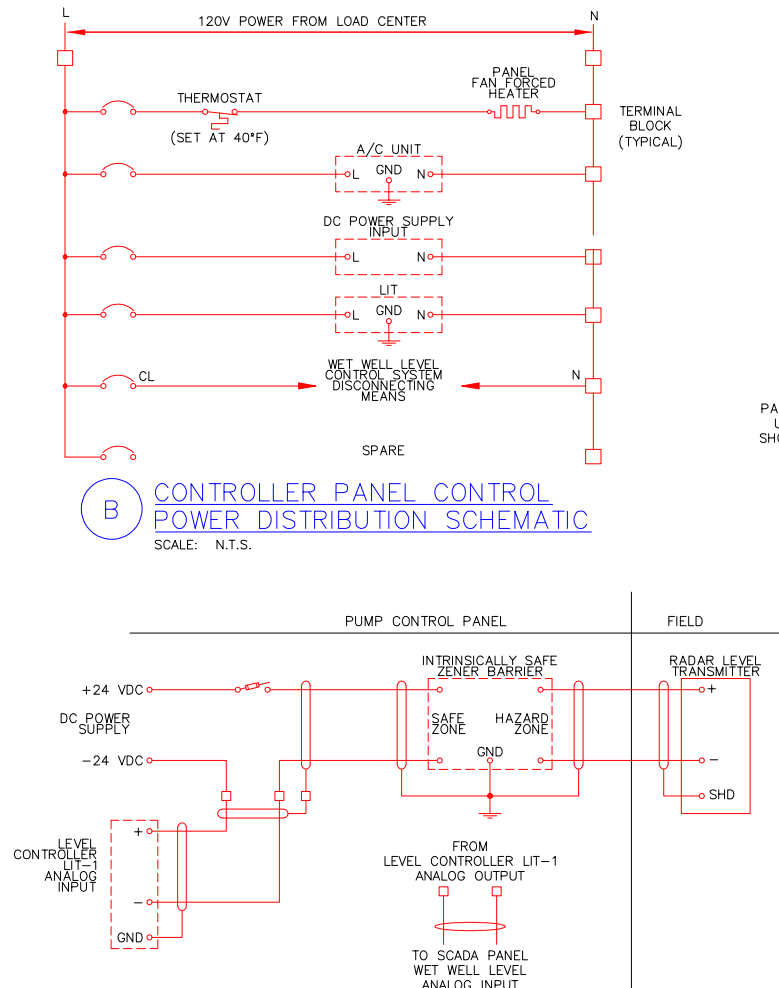
3. ALL ENCLOSURES SHALL BE PAD-LOCKABLE, PUMP CONTROL PANEL SHALL BE SINGLE DOOR, WALL MOUNTED TYPE. INSTALL ONE PUMP CONTROL PANEL FOR EACH PUMP INSTALLED. LEVEL CONTROL PANEL SHALL BE COMMON TO ALL PUMP CONTROL PANELS FOR AUTOMATIC CONTROL.
2. ALL MOUNTING HARDWARE AND STRUT CHANNEL SHALL BE OF STAINLESS STEEL 316. ALL ENCLOSURES SHALL BE NEMA 4X, STAINLESS STEEL 316. PUMP CONTROL PANEL AND SCADA ENCLOSURES SHALL ALSO BE WHITE ENAMEL COATED ON EXTERIOR.
3. CONDUIT PENETRATION TO ALL ENCLOSURES AND JUNCTION BOXES, REGARDLESS OF LOCATION, SHALL BE MADE AT THE BOTTOM FACE ONLY. CONDUIT PENETRATIONS ON BACK, SIDES OR TOP SHALL BE PROHIBITED.
4. SERVICE DISCONNECT MAIN BREAKER AND NON-FUSED SERVICE DISCONNECT SWITCH SHALL BE NEMA RATED AND BE ENCLOSED IN NEMA 4X, STAINLESS STEEL 316 ENCLOSURE.
5. SERVICE RACK STRUTS SHALL BE OF STAINLESS STEEL 316 1-1/2 INCH MINIMUM, AND SHALL BE MOUNTED ON 4-INCH X 1/2-INCH THICK STRUCTURAL STEEL TUBE. ALL STRUT CHANNEL ENDS SHALL BE PROTECTED WITH END CAPS.
6. THERE SHALL BE 6" MINIMUM SPACING BETWEEN EQUIPMENT MOUNTED ON THE RACK. WHEN PANEL MOUNT CLIMATE CONTROL UNITS ARE INSTALLED, THERE SHALL BE A MINIMUM SPACE CLEARANCE OF 24 INCHES.
7. ELECTRIC RACK SHALL HAVE SUPPORT COLUMNS EVERY 10 FEET, UNLESS OTHERWISE DETERMINED BY THE STRUCTURAL ENGINEER.
8. PROVIDE SEALING FITTING FOR ALL CONDUITS LEAVING THE RACK AND CONDUITS FOR SURGE PROTECTIVE DEVICES.
9. PROVIDE A TYPE 2 SURGE PROTECTIVE DEVICE IN A SEPARATE NEMA 4X, STAINLESS STEEL 316, WHITE ENAMELED COATED ENCLOSURE ADJACENT TO THE INCOMING SERVICE DISCONNECT SWITCH.
10. ALL LIFT STATIONS SHALL BE PROVIDED WITH A STAND-BY GENERATOR WITH AUTOMATIC TRANSFER SWITCH SIZED TO POWER ALL THE LIFT STATION LOAD, INCLUDING STANDBY PUMP.
11. ALL ELECTRICAL COMPONENTS SHALL BE NEMA RATED.
12. THE RESISTANCE TO GROUND SHALL NOT EXCEED 5 OHMS AT ANY POINT.
13. THE BOTTOM OF ALL JUNCTION BOXES AND ENCLOSURES FOR ELECTRICAL EQUIPMENT, INCLUDING METERS, DISCONNECT SWITCHES, PANELBOARDS, LOAD CENTERS, PUMP CONTROL PANELS, AND SCADA PANELS; LOCATED AT SERVICE POLE METER RACK, ELECTRIC SERVICE RACK, INSIDE AN ELECTRICAL BUILDING, AT THE WET WELL AREA, OR ANYWHERE ELSE, SHALL HAVE A MINIMUM 48-INCH VERTICAL CLEARANCE MEASURED FROM THE FINISH FLOOR TO THE BOTTOM FACE OF THE ENCLOSURE, PROVIDED THE VERTICAL CLEARANCE MEASURED FROM THE FINISHED FLOOR TO THE TOP FACE OF THE ENCLOSURE DOES NOT EXCEED 6.5 FEET AND IS OUTSIDE THE 100-YEAR FLOODPLAIN.
- 13.1. THE FINISHED FLOOR SHALL BE CONSIDERED THE SURFACE IN WHICH ELECTRICIANS WOULD STAND TO OPEN THE BOXES AND PERFORM WORK.
- 13.2. FOR LARGE RACK MOUNT ENCLOSURES, LIKE LARGE POWER DISTRIBUTION PANELBOARDS, LARGE PUMP CONTROL PANELS, LARGE TRANSFER SWITCHES, AND THE LIKE; SHALL BE PERMITTED TO HAVE A 24-INCH MINIMUM VERTICAL CLEARANCE MEASURED FROM THE FINISHED FLOOR TO THE BOTTOM FACE OF THE ENCLOSURE.

[illegible]



NOTE:
CONTROL LOOPS TYPICAL FOR DUPLEX INSTALLATIONS. FOR INSTALLATIONS WITH THREE OR MORE PUMPS, ADD RESPECTIVE CONTROL LOOPS TO ALLOW PROPER ALTERNATING AND LEAD-LAG CONTROL OF ALL PUMPS. THIS CONTROL SECTION SHALL BE INSTALLED IN THE LEVEL CONTROLLER ENCLOSURE.

A WET WELL LEVEL SYSTEM CONTROL SCHEMATIC
SCALE: N.T.S.



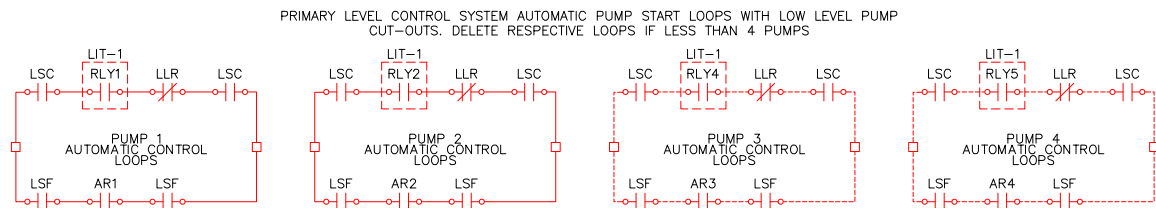
B CONTROLLER PANEL CONTROL POWER DISTRIBUTION SCHEMATIC
SCALE: N.T.S.



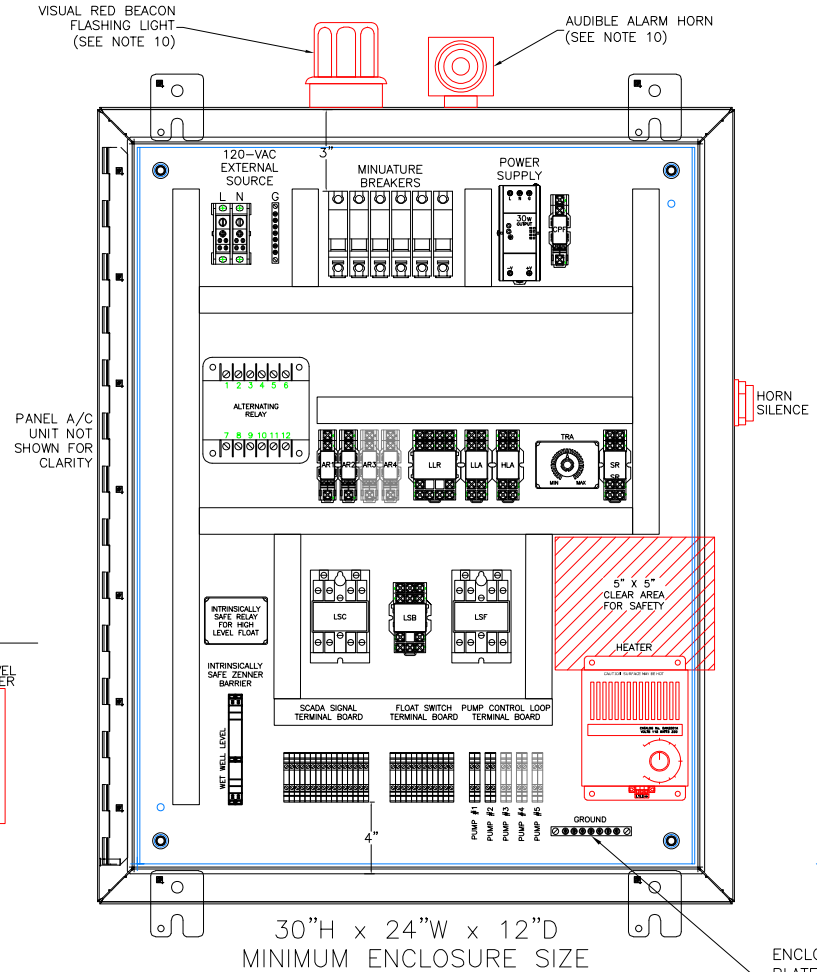
C WET WELL LEVEL TRANSMITTER INSTRUMENT WIRING SCHEMATIC
SCALE: N.T.S.

NOTES

- LEVEL CONTROLLER OUTPUT RELAYS RLY1, RLY2, RLY 4 AND RLY5 SHALL BE ASSIGNED TO A PUMP FUNCTION AND SHALL BE MANAGED BY A PUMPING ALGORITHM TO ALTERNATE THE LEAD PUMP AND LAGS FOR EACH PUMPING CYCLE.
- LEVEL CONTROLLER OUTPUT RELAYS RLY3 AND RLY6 SHALL BE ASSIGNED FOR WET WELL LOW LEVEL ALARM AND HIGH LEVEL ALARM RESPECTIVELY. UNDER NORMAL WET WELL LEVEL CONDITION, BOTH RELAYS SHALL BE DE-ENERGIZED AND CONTACTS OPEN. UNDER WET WELL LEVEL ALARM CONDITION, THE RESPECTIVE RELAY SHALL ENERGIZED AND CONTACT CLOSE.
- RELAY RLY3 (LOW LEVEL) IS A COMMON RELAY FOR ALL PUMPS INSTALLED. PROVIDE ADDITIONAL GENERAL PURPOSE RELAYS WHERE REQUIRED.
- HIGH LEVEL ALARM SHALL BE GENERATED WITH BOTH RELAY RLY6 (HIGH LEVEL) AND THE HIGH LEVEL FLOAT.
- ALL INDICATING LAMPS SHALL BE PUSH-TO-TEST TYPE.
- THE LOAD OF EACH INTERNAL DIGITAL RELAY OF THE LEVEL CONTROLLER MUST BE LIMITED TO NO MORE THAN ONE GENERAL PURPOSE RELAY COIL AND ONE TIME DELAY RELAY COIL, OR TWO GENERAL PURPOSE RELAY COILS.
- BACKUP FLOAT SWITCHES SHALL BE PROVIDED AND SHALL PROVIDE A BACKUP LEAD-LAD ALTERNATING ALGORITHM.
- ENCLOSURE SHALL INCLUDE A PANEL MOUNT A/C UNIT. THE MINIMUM CAPACITY OF THE A/C UNIT, FOR THE ENCLOSURE SIZE INDICATED, SHALL BE 1,300-BTU/HR FOR AN ENCLOSURE INTERNAL TEMPERATURE OF 80°F AND EXTERNAL AMBIENT TEMPERATURE OF 105°F. FOR LARGER ENCLOSURES, THE DESIGN ENGINEER SHALL SIZE THE COOLING CAPACITY FOR THE SAME TEMPERATURE PERFORMANCE.
- RELAYS LSC AND LSF SHALL BE OF THE NEMA INDUSTRIAL CONTROL RELAY TYPE WITH STACKABLE MULTIPLE CONTACTS, AND EACH RELAY SHALL BE PROVIDED WITH TWO (2) INDEPENDENT N.O. CONTACTS FOR EACH PUMP INSTALLED AND CONTROLLED RESPECTIVELY.
- INSTALL THE AUDIBLE ALARM HORN AND VISUAL RED BEACON FLASHING LIGHT ONTO THE LEVEL CONTROLLER PANEL. CONDUIT PENETRATION SHALL BE THROUGH THE ENCLOSURE BOTTOM SIDE AND BE SUPPORTED TO THE MOUNTING RACK. THE HORN SILENCE PUSH BUTTON IS THE ONLY PERMITTED TO BE INSTALLED ON THE RIGHT FACE OF THE ENCLOSURE. SEE CONTROLLER PANEL TYPICAL LAYOUT. FOR LIFT STATIONS WITH ELECTRICAL BUILDING, THE AUDIBLE ALARM HORN AND RED FLASHING BEACON LIGHT SHALL ONLY BE INSTALLED AT LEAST AT TWO LOCATIONS OUTSIDE THE ELECTRICAL BUILDING. A PARALLEL HORN SILENCE BUTTON ALSO NEEDS TO BE INSTALLED OUTSIDE THE ELECTRICAL BUILDING NEXT TO THE ACCESS DOOR AND MUST BE ENCLOSED IN A NEMA 4X BOX MADE OF STAINLESS STEEL 316.



D AUTOMATIC CONTROL LOOPS FOR PUMPS
SCALE: N.T.S.

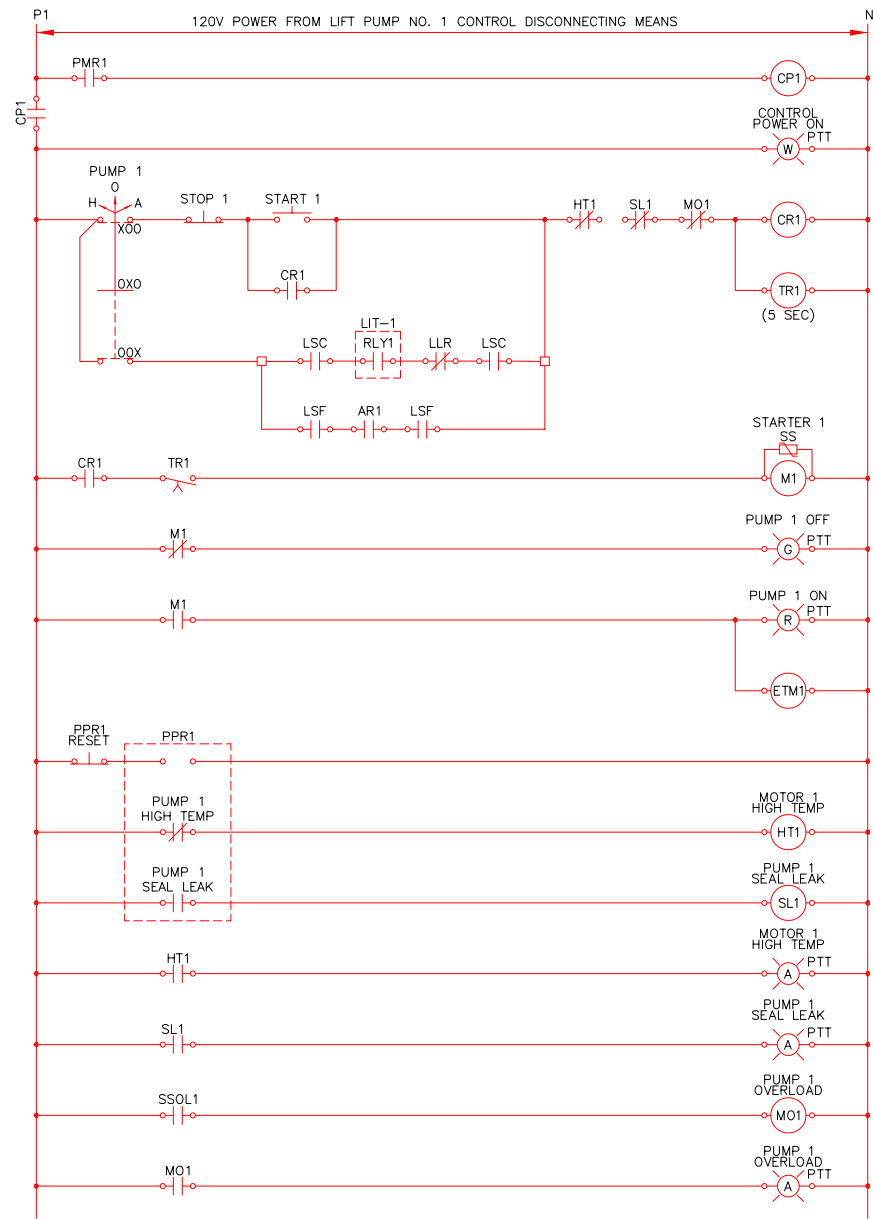


E CONTROLLER PANEL TYPICAL LAYOUT

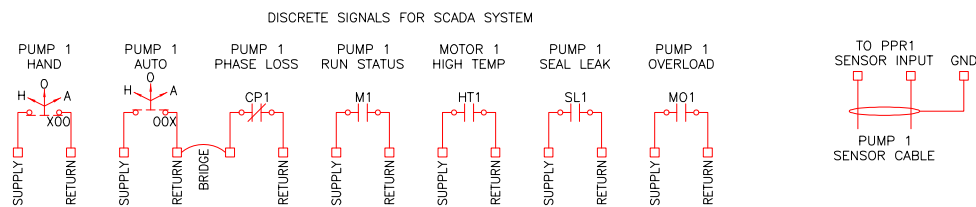
ELECTRICAL ABBREVIATIONS

AR1	ALTERNATING RELAY PUMP 1 RUN COMMAND
AR2	ALTERNATING RELAY PUMP 2 RUN COMMAND
AR3	ALTERNATING RELAY PUMP 3 RUN COMMAND (IF 3 PUMPS INSTALLED)
AR4	ALTERNATING RELAY PUMP 4 RUN COMMAND (IF 4 PUMPS INSTALLED)
CPF	CONTROL POWER FAILURE RELAY
HLA	HIGH LEVEL ALARM RELAY
LLA	LOW LEVEL ALARM RELAY
LLR	LOW LEVEL RELAY FOR LOCKING PUMPS
LSB	LEVEL SELECTION BOTH CONTROLLER AND BACKUP FLOATS RELAY
LSC	LEVEL SELECTION CONTROLLER
LSC2	LEVEL SELECTION CONTROLLER (IF FIFTH PUMP INSTALLED)
LSF	LEVEL SELECTION BACKUP FLOATS
LIT	LEVEL CONTROLLER
SR	SILENCE RELAY
TRA	ALARM TIME DELAY RELAY

	LEVEL CONTROL AND CONTROL POWER DISTRIBUTION
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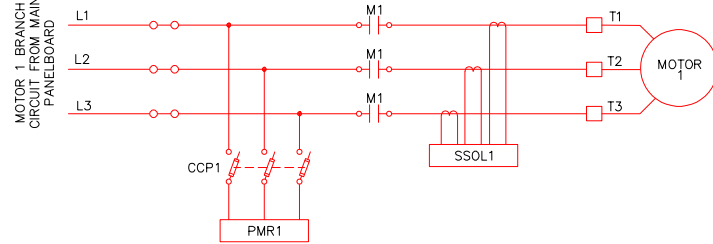


NOTE:
CONTROL LOOPS SPECIFIC FOR EACH
LIFT PUMP INSTALLED. DESIGN
ENGINEER MUST DUPLICATE THESE
CONTROL LOOPS IN THE LIFT STATION
MOTOR CONTROL DESIGN AND MUST
UPDATE RELAY NUMBERING
RESPECTIVELY.



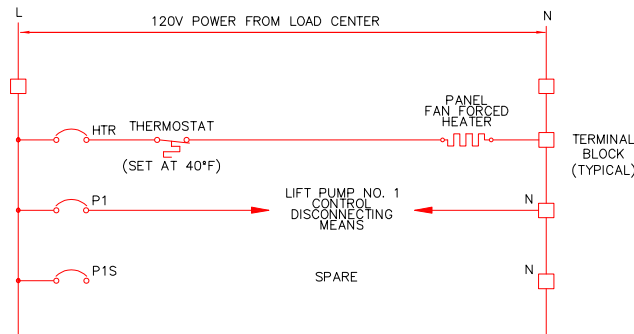
A TYPICAL LIFT PUMP CONTROL SCHEMATIC – FVNR STARTER

SCALE: N.T.S.
TYPICAL CONTROL LOGIC FOR LIFT PUMP WITH FULL VOLTAGE NON-REVERSING STARTER.
DESIGN ENGINEER IS RESPONSIBLE FOR EXPANDING THIS CONTROL LOGIC AS REQUIRED.
DEDICATED CONTROL LOGIC DRAWING (NOT TYPICAL) SHALL BE SHOWN FOR EACH LIFT
PUMP.

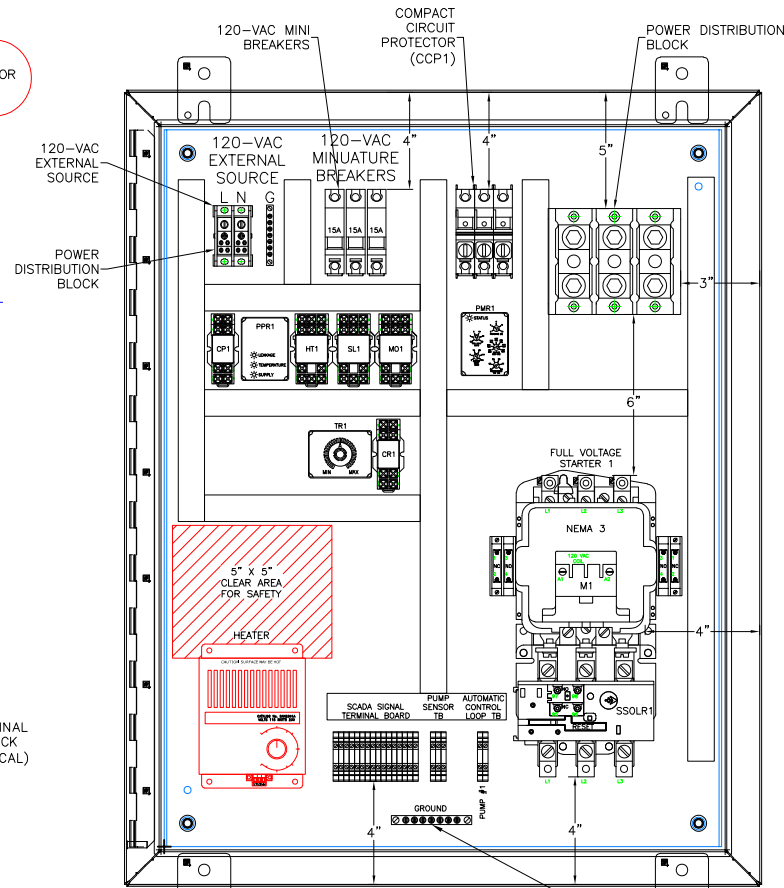


B TYPICAL LIFT PUMP THREE LINE DIAGRAM
FULL VOLTAGE STARTER

SCALE: N.T.S.
TYPICAL LIFT PUMP WITH FULL VOLTAGE STARTER. DESIGN
ENGINEER IS RESPONSIBLE FOR EXPANDING THIS THREE LINE
DIAGRAM AS REQUIRED.



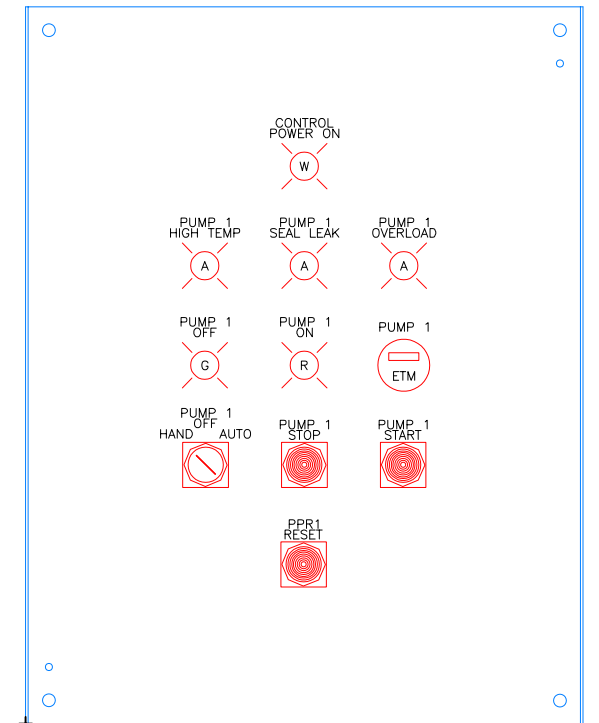
C PUMP CONTROL PANEL CONTROL POWER
DISTRIBUTION SCHEMATIC



30"H x 24"W x 12"D
MINIMUM ENCLOSURE SIZE

ENCLOSURE GROUNDING BAR MADE OF TIN PLATED COPPER. INSTALL BARE
STRANDED COPPER AND BOND TO COMMON GROUND FOR SUPPLEMENTAL
GROUNDING. SIZE OF SUPPLEMENTAL GROUNDING CONDUCTOR SHALL BE TWO
STANDARD SIZES SMALLER THAN THE MOTOR BRANCH PHASE CONDUCTORS, BUT
IN NO CASE SHALL BE SMALLER THAN #6-AWG.

D PUMP CONTROL PANEL
TYPICAL LAYOUT



INTERNAL SWING PANEL

NOTES

- ALL INDICATING LAMPS SHALL BE PUSH-TO-TEST TYPE.
- PUMP PROTECTION RELAYS SHALL BE PROVIDED FOR EACH PUMP INSTALLED.
AT A MINIMUM PROVIDE PROTECTION AGAINST MOTOR HIGH TEMPERATURE
AND PUMP SEAL LEAK.
- LEVEL SENSOR PROBES FOR PUMP CONTROL ARE NOT ALLOWED.
- THE LOAD OF EACH INTERNAL DIGITAL RELAY OF THE LEVEL CONTROLLER
MUST BE LIMITED TO NO MORE THAN ONE GENERAL PURPOSE RELAY COIL
AND ONE TIME DELAY RELAY COIL, OR TWO GENERAL PURPOSE RELAY
COILS.
- PUMP PROTECTION RELAY CONTACT LOGIC SHALL BE AS FOLLOW:
5.A. UNDER NORMAL CONDITIONS, THE N.C. HIGH TEMP CONTACT IS OPEN,
AND THE N.O. SEAL LEAK CONTACT IS OPEN.
5.B. UNDER MOTOR HIGH TEMP CONDITION, THE N.C. HIGH TEMP CONTACT
CLOSES.
5.C. UNDER PUMP SEAL LEAK CONDITION, THE N.O. SEAL LEAK CONTACT
CLOSES.
- PHASE MONITORING RELAY SHALL BE MACROMATIC PMP, OR EQUIVALENT
WITH ADJUSTABLE TIME DELAY AND TRIP SETTINGS.
- COMPACT CIRCUIT PROTECTOR SHALL CONSIST OF DISCONNECT SWITCH WITH
CLASS CC FAST ACTING FUSES. BUSSMANN COMPACT CIRCUIT PROTECTOR,
OR EQUIVALENT.
- ENCLOSURE MUST BE BONDED TO GROUND, INCLUDING DOOR, BACK PANEL,
SWING PANEL AND CONDUITS.

ELECTRICAL ABBREVIATIONS

AR	ALTERNATING RELAY FOR FLOAT MODE
CCP	COMPACT CIRCUIT PROTECTOR
CP	CONTROL POWER RELAY
CR	CONTROL RELAY
ETM	ELAPSED TIME METER
HT	HIGH TEMPERATURE RELAY
LIT	LEVEL CONTROLLER
LLR	LOW LEVEL RELAY CUTOFF
LSC	LEVEL SYSTEM WITH CONTROLLER
LSF	LEVEL SYSTEM WITH FLOATS
M	FULL VOLTAGE STARTER
MO	MOTOR OVERLOAD RELAY
PMR	PHASE MONITORING RELAY
PPR	PUMP PROTECTION RELAY
PPT	PUSH-TO-TEST
SL	SEAL LEAK RELAY
SS	COIL SURGE SUPPRESSOR
SSOL	SOLID STATE OVERLOAD RELAY
TR	TIMING RELAY



PUMP FULL VOLTAGE CONTROL WIRING

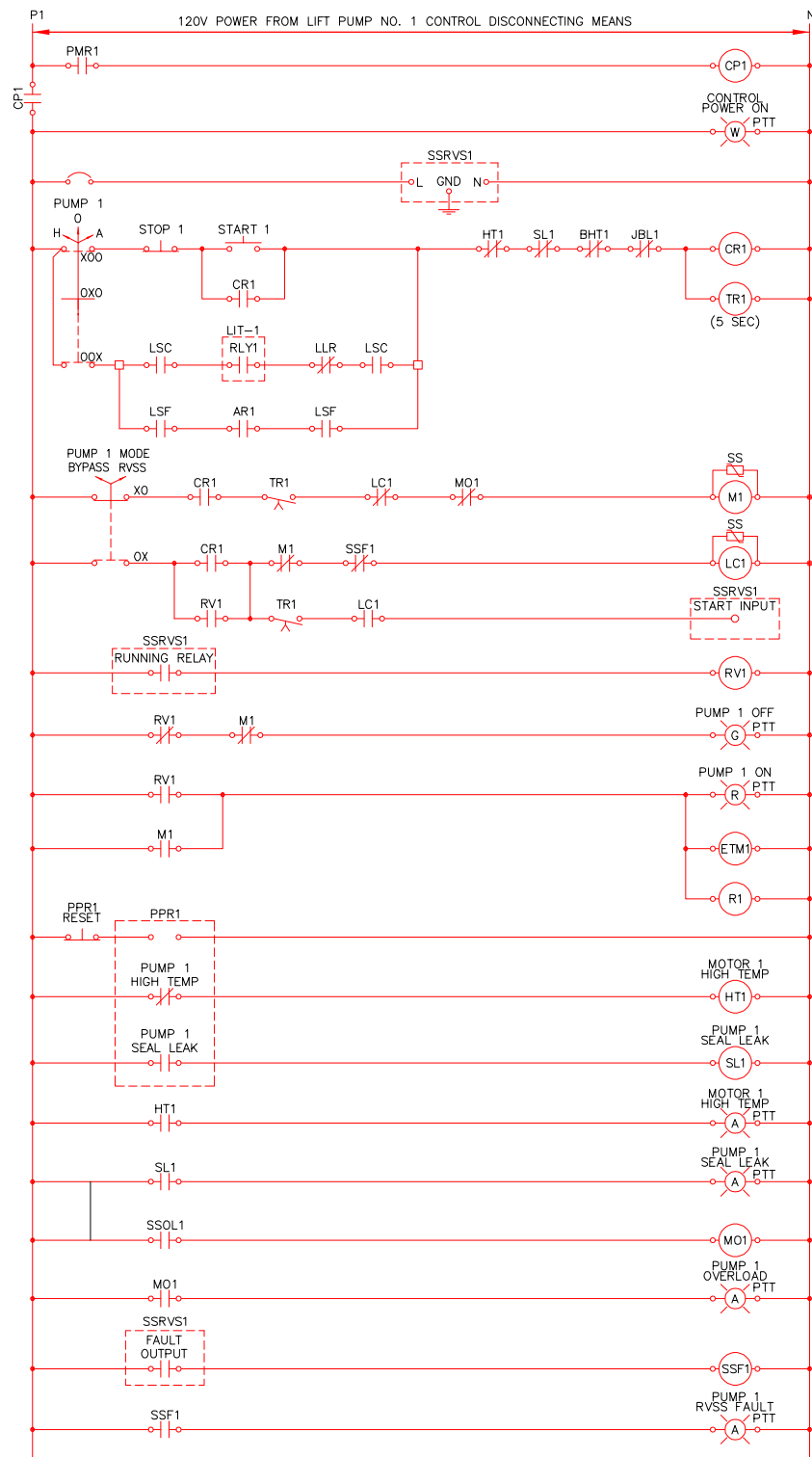
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JUN 2026

PLANTS AND MAJOR PROJECTS

PROPERTY OF
SAN ANTONIO WATER SYSTEM
SAN ANTONIO, TEXAS

DD-903-03

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OF 19



A TYPICAL LIFT PUMP CONTROL SCHEMATIC – RVSS WITH FVNR BYPASS LIFT PUMP CONTROL SCHEMATIC

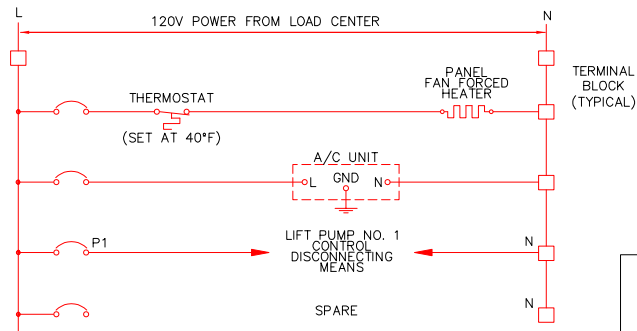
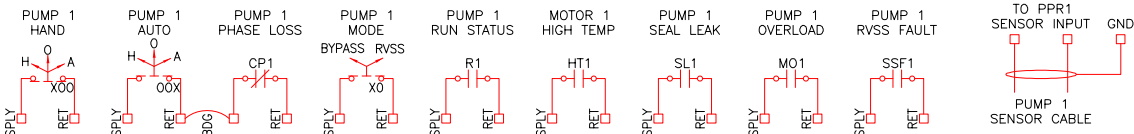
SCALE: N.T.S.

TYPICAL CONTROL LOGIC FOR LIFT PUMP WITH REDUCED VOLTAGE SOLID STATE STARTER AND FULL VOLTAGE NON-REVERSING BYPASS STARTER. DESIGN ENGINEER IS RESPONSIBLE FOR EXPANDING THIS TYPICAL CONTROL LOGIC AS REQUIRED. DEDICATED CONTROL LOGIC DRAWING (NOT TYPICAL) SHALL BE SHOWN FOR EACH LIFT PUMP.

NOTE:

CONTROL LOOPS SPECIFIC FOR EACH LIFT PUMP INSTALLED. DESIGN ENGINEER MUST DUPLICATE THESE CONTROL LOOPS IN THE LIFT STATION MOTOR CONTROL DESIGN AND MUST UPDATE RELAY NUMBERING RESPECTIVELY.

DISCRETE SIGNALS FOR SCADA SYSTEM



B PUMP CONTROL PANEL CONTROL POWER DISTRIBUTION SCHEMATIC

NOTES

1. ALL INDICATING LAMPS SHALL BE PUSH-TO-TEST TYPE.
2. PUMP PROTECTION RELAYS SHALL BE PROVIDED FOR EACH PUMP INSTALLED. AT A MINIMUM PROVIDE PROTECTION AGAINST MOTOR HIGH TEMPERATURE AND PUMP SEAL LEAK.
3. LEVEL SENSOR PROBES FOR PUMP CONTROL ARE NOT ALLOWED.
4. THE LOAD OF EACH INTERNAL DIGITAL RELAY OF THE LEVEL CONTROLLER MUST BE LIMITED TO NO MORE THAN ONE GENERAL PURPOSE RELAY COIL AND ONE TIME DELAY RELAY COIL, OR TWO GENERAL PURPOSE RELAY COILS.
5. PUMP PROTECTION RELAY CONTACT LOGIC SHALL BE AS FOLLOW:
 - 5.A. UNDER NORMAL CONDITIONS, N.C. HIGH TEMP CONTACT IS OPEN, AND N.O. SEAL LEAK CONTACT IS OPEN.
 - 5.B. UNDER MOTOR HIGH TEMP CONDITION, THE N.C. HIGH TEMP CONTACT CLOSSES.
 - 5.C. UNDER PUMP SEAL LEAK CONDITION, THE N.O. SEAL LEAK CONTACT CLOSSES.
6. SOFT STARTER FAULT OUTPUT RELAY SHALL BE OPEN UNDER NORMAL CONDITION AND SHALL CLOSE UNDER SOFT STARTER FAULT CONDITION.
7. THE CONTACT OF THE OVERLOAD RELAY FOR THE FULL VOLTAGE BYPASS STARTER SHALL BE OPEN UNDER NORMAL CONDITION AND SHALL CLOSE UNDER OVERLOAD CONDITION.
8. THE PERFORMANCE OF THE A/C UNIT SHOWN IS FOR THE ENCLOSURE SIZE INDICATED. FOR LARGER ENCLOSURES, THE DESIGN ENGINEER SHALL SIZE THE BTU CAPACITY TO MAINTAIN THE SAME TEMPERATURE PERFORMANCE.
9. PHASE MONITORING RELAY SHALL BE MACROMATIC PMP, OR EQUIVALENT WITH ADJUSTABLE TIME DELAY AND TRIP SETTINGS.
10. COMPACT CIRCUIT PROTECTOR SHALL CONSIST OF DISCONNECT SWITCH WITH CLASS CC FAST ACTING FUSES. BUSSMANN COMPACT CIRCUIT PROTECTOR, OR EQUIVALENT.
11. ENCLOSURE MUST BE BONDED TO GROUND, INCLUDING DOOR, BACK PANEL, SWING PANEL AND CONDUITS.

ELECTRICAL ABBREVIATIONS

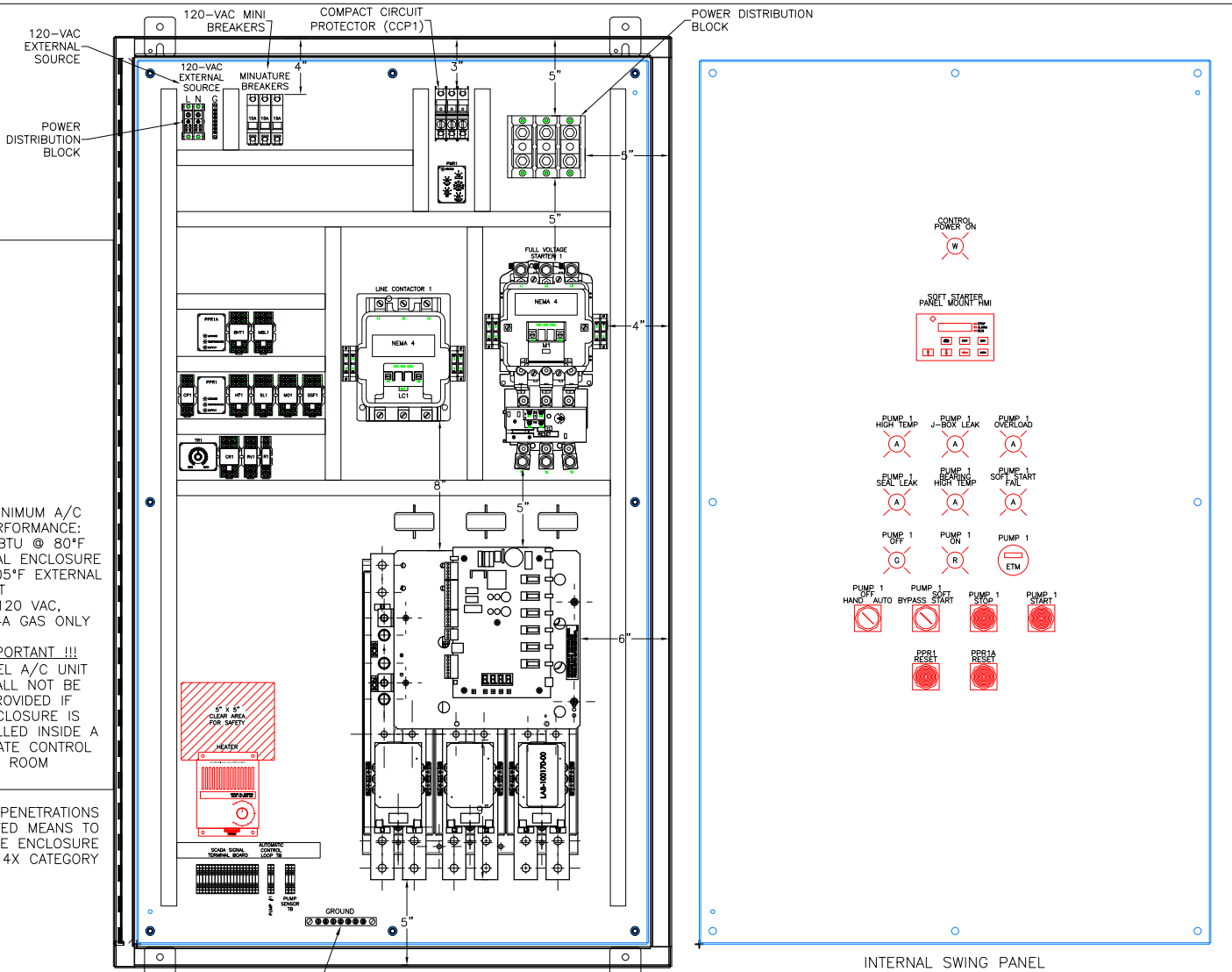
AR	ALTERNATING RELAY FOR FLOAT MODE
BHT	BEARING HIGH TEMPERATURE RELAY
CCP	COMPACT CIRCUIT PROTECTOR
CP	CONTROL POWER RELAY
CR	CONTROL RELAY
ETM	ELAPSED TIME METER
HT	MOTOR HIGH TEMPERATURE RELAY
LC	RVSS LINE CONTACTOR
LIT	LEVEL CONTROLLER
LLR	LOW LEVEL RELAY CUTOFF
LSC	LEVEL SYSTEM WITH CONTROLLER
LSF	LEVEL SYSTEM WITH FLOATS
M	FULL VOLTAGE BYPASS STARTER
MBL	PUMP MOTOR BOX LEAK RELAY
MO	MOTOR OVERLOAD RELAY
PMR	PHASE MONITORING RELAY
PPR	PUMP PROTECTION RELAY
PPT	PUSH-TO-TEST
R	RUN INDICATION RELAY
RV	SSRVs RUN AUXILIARY RELAY
SC	SSRVs INTERNAL SHORTING CONTACTOR
SL	SEAL LEAK RELAY
SS	COIL SURGE SUPPRESSOR
SSF	SOFT STARTER FAULT RELAY
SSOL	SOLID STATE OVERLOAD RELAY
SSRVs	SOLID STATE REDUCED VOLTAGE STARTER
TR	TIMING RELAY

MINIMUM A/C PERFORMANCE:
2,800 BTU @ 80°F
INTERNAL ENCLOSURE
AND 105°F EXTERNAL AMBIENT
120 VAC,
R134A GAS ONLY

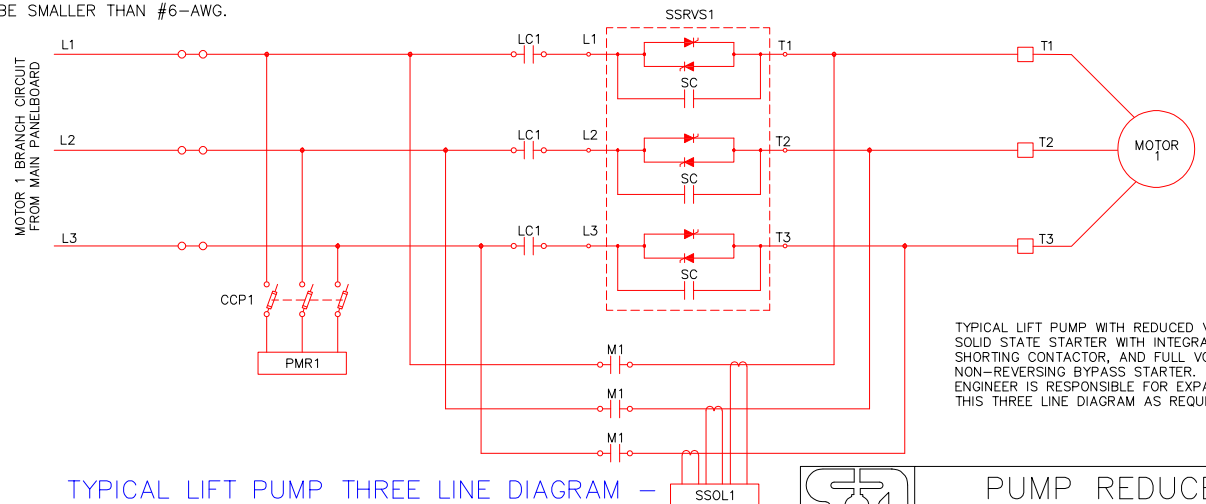
IMPORTANT !!!
PANEL A/C UNIT
SHALL NOT BE
PROVIDED IF
ENCLOSURE IS
INSTALLED INSIDE A
CLIMATE CONTROL
ROOM

SEAL A/C UNIT PENETRATIONS
WITH APPROVED MEANS TO
MAINTAIN THE ENCLOSURE
NEMA 4X CATEGORY

ENCLOSURE GROUNDING BAR MADE OF TIN PLATED
COPPER. INSTALL BARE STRANDED COPPER AND BOND
TO COMMON GROUND FOR SUPPLEMENTAL GROUNDING.
SIZE OF SUPPLEMENTAL GROUNDING CONDUCTOR
SHALL BE TWO STANDARD SIZES SMALLER THAN THE
MOTOR BRANCH PHASE CONDUCTORS, BUT IN NO
CASE SHALL BE SMALLER THAN #6-AWG.



D PUMP CONTROL PANEL TYPICAL LAYOUT



C TYPICAL LIFT PUMP THREE LINE DIAGRAM – RVSS WITH FVNR BYPASS STARTER

SCALE: N.T.S.



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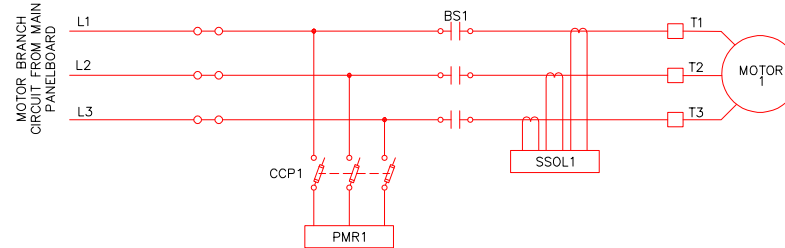
**PUMP REDUCED
VOLTAGE CONTROL
WIRING**

PLANTS AND MAJOR PROJECTS

PROPERTY OF
SAN ANTONIO WATER SYSTEM
SAN ANTONIO, TEXAS

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SCALE: N.T.S.
TYPICAL ODOR CONTROL BLOWER WITH FULL VOLTAGE STARTER
DESIGN ENGINEER IS RESPONSIBLE FOR EXPANDING THIS THREE
LINE DIAGRAM AS REQUIRED.



BLOWERS NOT REQUIRED TO BE MONITORED THROUGH SCADA

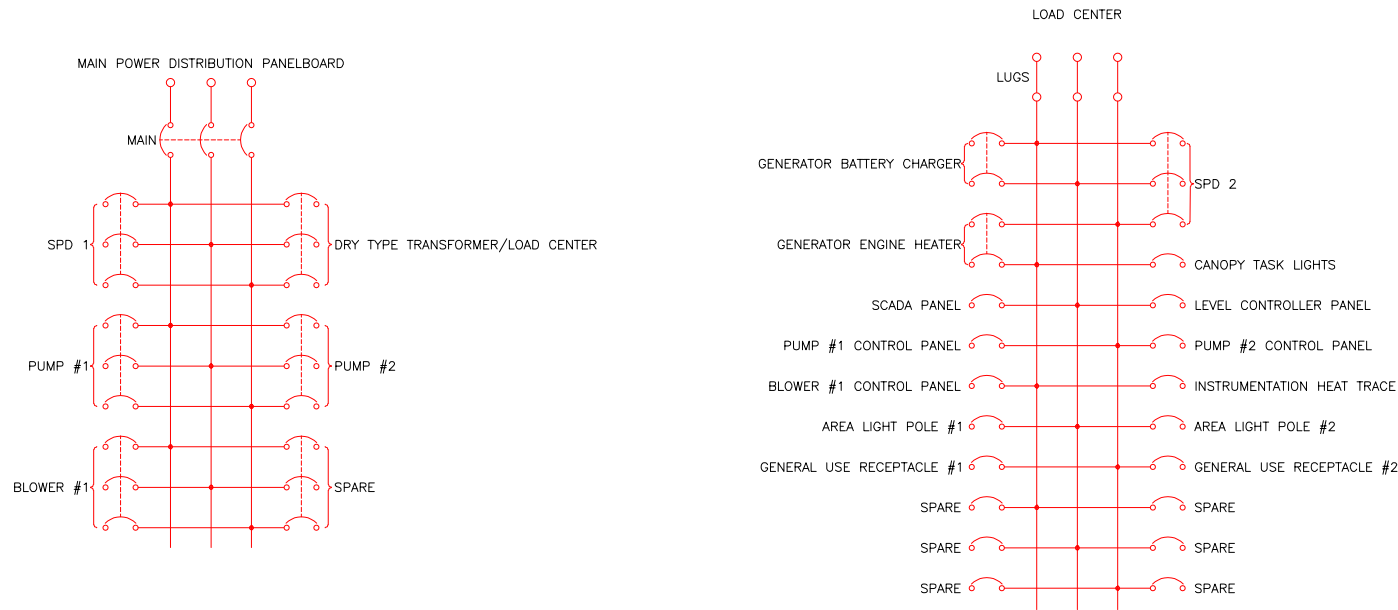
A SCHEMATIC – FVNR STARTER

SCALE: N.T.S.

TYPICAL CONTROL LOGIC FOR ODOR CONTROL BLOWER WITH FULL VOLTAGE NON-REVERSING STARTER. DESIGN ENGINEER IS RESPONSIBLE FOR EXPANDING THIS CONTROL LOGIC AS REQUIRED. DEDICATED CONTROL LOGIC DRAWING (NOT TYPICAL) SHALL BE SHOWN FOR EACH ODOR CONTROL BLOWER.

BS	BLOWER FULL VOLTAGE STARTER
BT	BLOWER OVER TEMPERATURE RELAY
CP	CONTROL POWER RELAY
CCP	COMPACT CIRCUIT PROTECTOR
ETM	ELAPSED TIME METER
PMR	PHASE MONITORING RELAY
SS	COIL SURGE SUPPRESSOR
SSOL	SOLID STATE OVERLOAD RELAY
TR	TIME DELAY RELAY

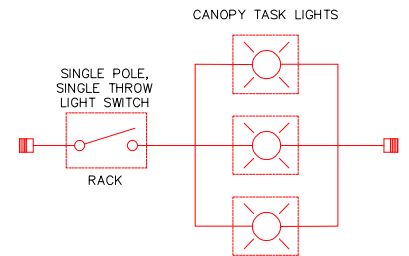
1. ALL INDICATING LAMPS SHALL BE PUSH-TO-TEST TYPE.
2. THE BLOWER INTERNAL THERMAL SWITCH IS CLOSED UNDER NORMAL CONDITION AND SHALL OPEN UNDER BLOWER OVERTEMPERATURE CONDITION.
3. PHASE MONITORING RELAY SHALL BE MACROMATIC PMP, OR EQUIVALENT WITH ADJUSTABLE TIME DELAY AND TRIP SETTINGS.
4. COMPACT CIRCUIT PROTECTOR SHALL CONSIST OF DISCONNECT SWITCH WITH CLASS CC FAST ACTING FUSES. BUSSMANN COMPACT CIRCUIT PROTECTOR, OR EQUIVALENT.
5. ENCLOSURE MUST BE BONDED TO GROUND, INCLUDING DOOR, BACK PANEL, SWING PANEL AND CONDUITS.



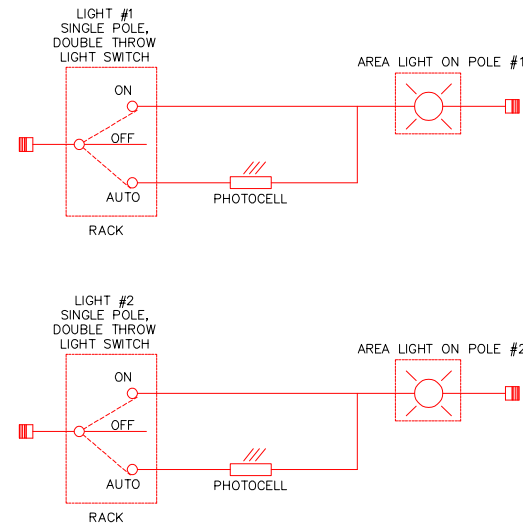
A MAIN DISTRIBUTION PANELBOARD AND LOAD CENTER
SCALE: N.T.S.

KEY NOTES:

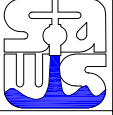
1. THE MAIN POWER DISTRIBUTION PANELBOARD SHOWS A TYPICAL INSTALLATION FOR A DUPLEX LIFT STATION. DESIGN ENGINEER SHALL MODIFY THE DETAILS FOR DIFFERENT QUANTITY OF PUMPS, ODOR BLOWERS AND ANY ADDITIONAL EQUIPMENT. SIMILARLY, THE LOAD CENTER SHALL BE MODIFIED FOR DIFFERENT QUANTITY OF PUMP CONTROL PANELS, ODOR CONTROL BLOWER PANELS, AND ANY ADDITIONAL RECEPTACLES, LIGHTS AND MISCELLANEOUS LOADS NOT SHOWN HERE.
2. THE VOLTAGE SYSTEM OF THE MAIN POWER DISTRIBUTION PANELBOARD SHALL BE THE SAME VOLTAGE SYSTEM AS THE ELECTRIC SERVICE.
3. THE MAIN POWER DISTRIBUTION PANELBOARD SHALL BE OF THE BOLT-ON TYPE BREAKER. ALL BREAKERS SHALL BE MOLDED CASE CIRCUIT BREAKERS WITH ELECTRONIC TRIP UNIT THAT PROVIDES ADJUSTABLE TRIP SETTINGS FOR LONG DELAY TRIP, SHORT DELAY TRIP AND INSTANTANEOUS TRIP.
4. THE LOAD CENTER SHALL BE 3-PHASE AND BE OF THE BOLT-ON TYPE THERMALMAGNETIC BREAKERS.
5. FOR LIFT STATIONS WITH 208Y/120-VAC ELECTRIC SERVICE, THE LOAD CENTER WILL STILL BE REQUIRED, BUT NOT THE DRY TYPE TRANSFORMER.
6. THE SPARES SHOWN SHALL BE PROVIDED AS A MINIMUM.

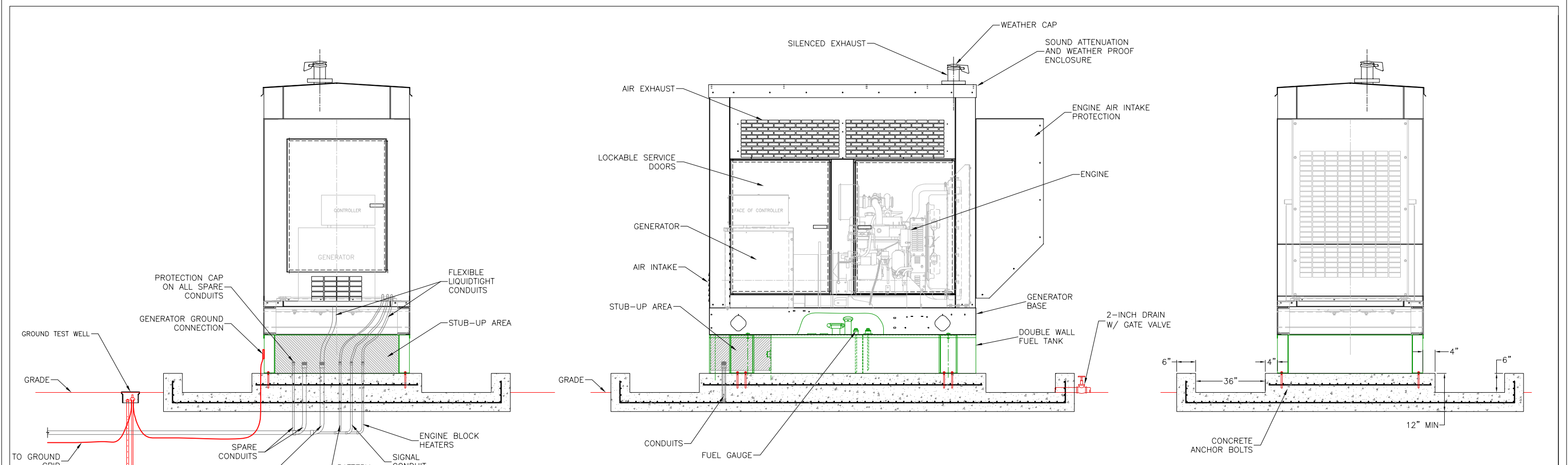


B CANOPY TASK LIGHT WIRING
SCALE: N.T.S.



C AREA LIGHT POLE WIRING
SCALE: N.T.S.

	LOAD CENTER & LIGHT SWITCHES DETAILS	
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GENERATOR SIDE VIEW

GENERATOR BACK VIEW

GENERATOR FRONT VIEW

STAND BY GENERATOR INSTALLATION DETAILS

SCALE: N.T.S.

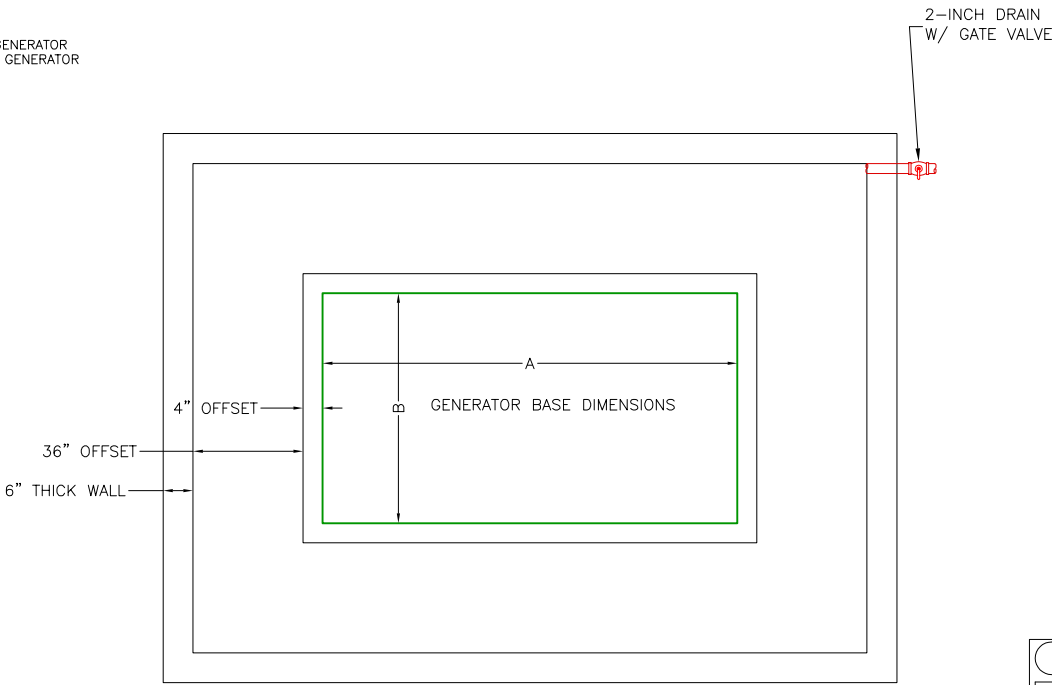
IMPORTANT NOTES:

1. DESIGN ENGINEER SHALL VERIFY GENERATOR INSTALLATION REQUIREMENTS WITH GENERATOR MANUFACTURER.

NOTES

- VOLTAGE DIP SHALL NOT DROP BELOW 15% AND FREQUENCY SHALL NOT DROP BELOW 5% MEASURED AT THE TERMINALS AT THE PUMP CONTROL PANEL WHEN THE LARGEST MOTOR IS STARTED ACROSS-THE-LINE, WHILE ALL OTHER LIFT STATION MOTORS AND ALL OTHER LOADS ARE RUNNING AT FULL LOAD.
- GENERATOR FRAME SHALL BE SOLIDLY BONDED TO THE REST OF THE GROUNDING SYSTEM AT EACH CORNER. GROUND RESISTANCE MEASURED AT THE GENERATOR SHALL HAVE THE SAME MAGNITUDE AS THE REST OF THE GROUNDING SYSTEM, AND IT SHALL NOT EXCEED 5 OHMS.
- GENERATOR SHALL BE WIRED AS A NON-SEPARATELY DERIVED SYSTEM, IN STRICT COMPLIANCE WITH NEC CURRENT REQUIREMENT.
- GENERATOR SHALL BE PROVIDED WITH SOUND ATTENUATION ENCLOSURE AND EXHAUST, AND MUST BE WEATHER PROOF. SEE SAWS LIFT STATION DESIGN AND CONSTRUCTION GUIDELINES TEXT DOCUMENT FOR OTHER GENERATOR REQUIREMENTS.
- GENERATOR FRAME SHALL BE SOLIDLY ANCHORED TO CONCRETE SLAB WITH HIGH STRENGTH FASTENERS.
- CONDUITS SHALL INCLUDE AC POWER, BATTERY CHARGER, ENGINE BLOCK HEATER, SIGNAL AND SPARE.
- FUEL TANK SHALL BE DOUBLE WALL TYPE.
- CONCRETE SLAB MUST BE DESIGNED BY A STRUCTURAL ENGINEER AND MUST INCLUDE A PARTIAL CONTAINMENT STRUCTURE AS SHOWN IN DETAIL B OF THIS SHEET. A 2-INCH DRAIN PIPE AND GATE VALVE SHALL BE PROVIDED.
- A MINIMUM 5-FOOT DEDICATED CLEARANCE AROUND GENERATOR CONTAINMENT SLAB SHALL BE PROVIDED, IN STRICT COMPLIANCE WITH SAWS LIFT STATION DESIGN AND CONSTRUCTION GUIDELINES TEXT DOCUMENT.
- CONDUIT STUB-UP AREA SHOWN IN THIS DRAWING IS FOR ILLUSTRATION PURPOSES ONLY. DESIGN ENGINEER MUST VERIFY THE LOCATION OF THE STUB-UP AREA WITH THE GENERATOR MANUFACTURER. CONDUIT DUCT BANK AND STUBUPS SHALL COMPLY WITH STANDARD DETAILS OF THESE STANDARDS DRAWINGS.

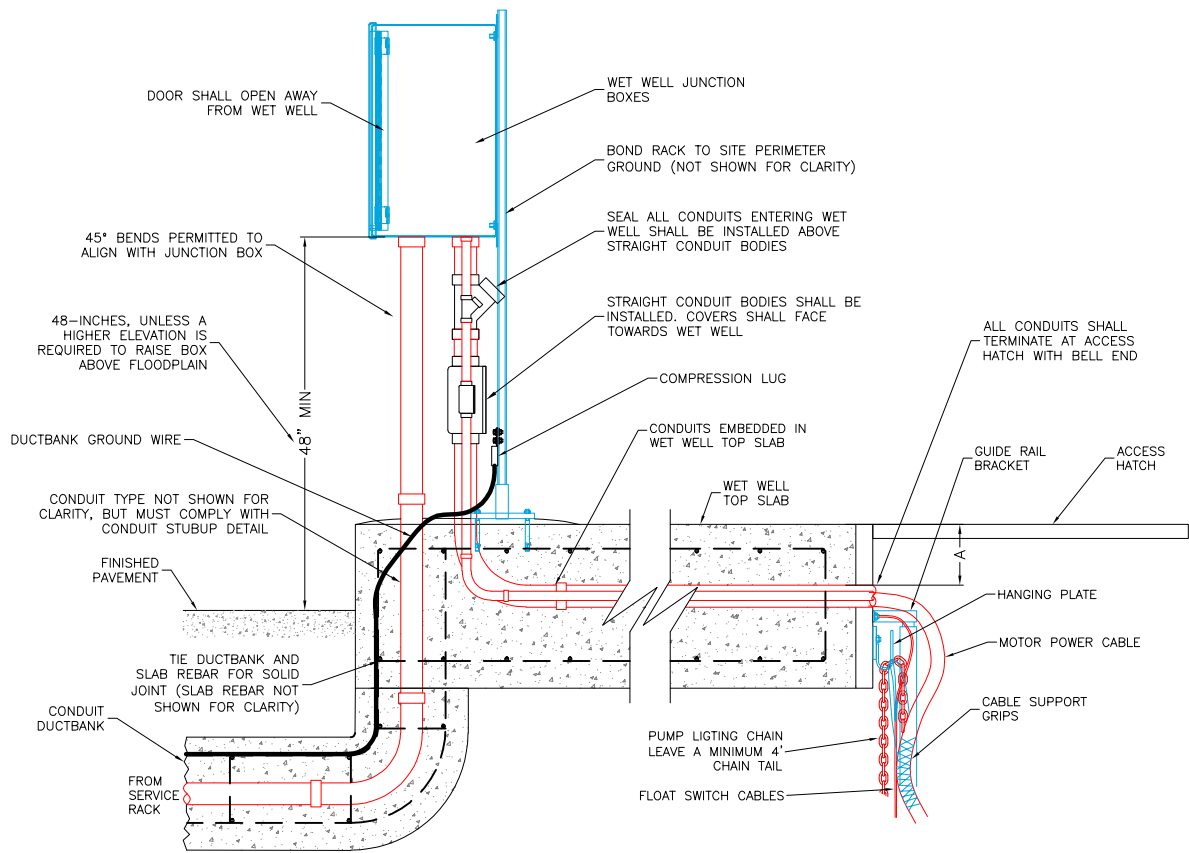
GENERATOR INFORMATION	
MANUFACTURER	
GENERATOR MODEL	
ENGINE MODEL	
ALTERNATOR MODEL	
STAND-BY POWER CAPACITY	_____ kW
STAND-BY POWER CAPACITY	_____ kVA
RATED VOLTAGE	_____ V
FULL LOAD AMPS	_____ A
MOTOR STARTING CAPACITY	_____ kVA
PERCENT OF VOLTAGE DIP	_____ %



CONTAINMENT BASE DETAILS

SCALE: N.T.S.

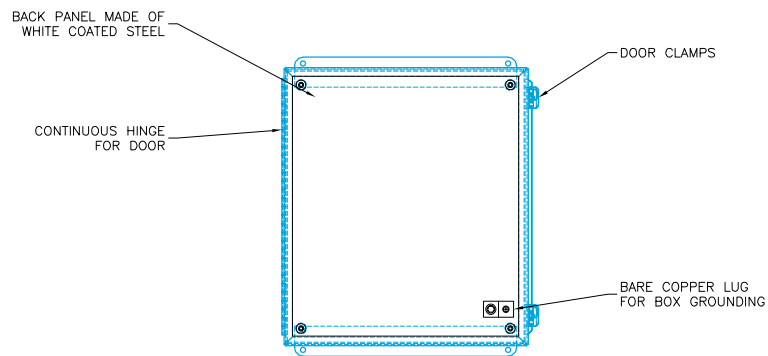
	GENERATOR INSTALLATION DETAILS	
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A WET WELL JUNCTION BOX DETAIL

SCALE: N.T.S.

A = 5 TO 7 INCHES FROM TOP SLAB TO TOP OF CONDUITS



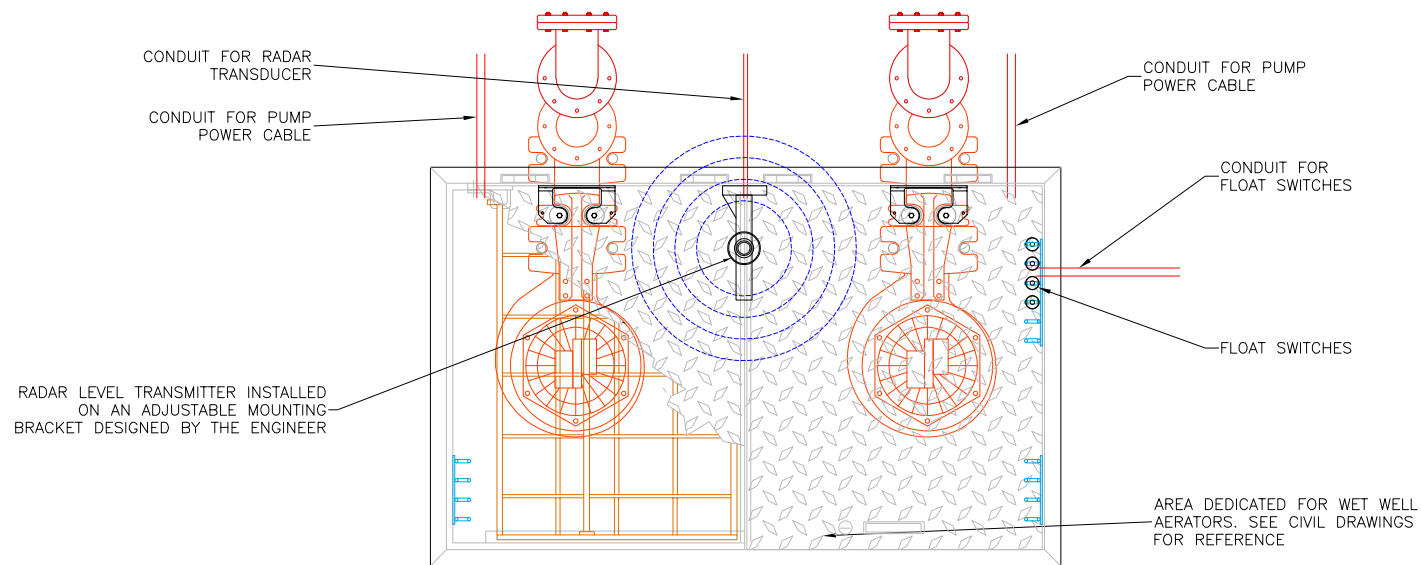
KEY NOTES:

1. THIS JUNCTION BOX DETAIL APPLIES TO ALL JUNCTION BOXES INSTALLED FOR ANALOG SIGNAL WIRING FOR INSTRUMENTATION AND CONTROL DEVICES SUCH AS SUBMERSIBLE LEVEL TRANSMITTERS, DISCHARGE PRESSURE TRANSMITTERS, OR ANY INSTRUMENTATION AND CONTROL DEVICE THAT IS INSTALLED BUT NOT SHOWN ON THESE STANDARD DRAWINGS.
2. ANALOG SIGNAL CABLES SHALL BE CONTINUOUS AND WITHOUT SPLICES, FROM INSTRUMENT, THROUGH JUNCTION BOX, TO RESPECTIVE ANALOG I/O MODULE OR DEVICE. ANALOG SIGNAL CABLE SHALL BE LOOPED AND TIED IN A NEAT MANNER AND WITHOUT OVER BENDING.
3. ANALOG SIGNAL WIRING SHALL NOT BE MIXED WITH ANY OTHER POWER, CONTROL OR SIGNAL WIRING.
4. JUNCTION BOXES SHALL BE SIZED BASED ON THE SIZE, BENDING RADIUS, NUMBER OF LOOPS, AND TOTAL NUMBER OF ANALOG SIGNAL CABLES CONTAINED, BUT IN NO CASE SHALL THE INSTRUMENTATION AND CONTROL JUNCTION BOXES BE SMALLER THAN 16(H)x12(W)x8(D)-INCHES.
5. ALL ALUMINUM CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS AND SHALL BE BONDED.
6. BOND JUNCTION BOX, EACH CONDUIT BUSHING, J-BOX COVER AND BACK PANEL TO GROUND.

C ANALOG SIGNAL WIRING JUNCTION BOX DETAIL

SCALE: N.T.S.

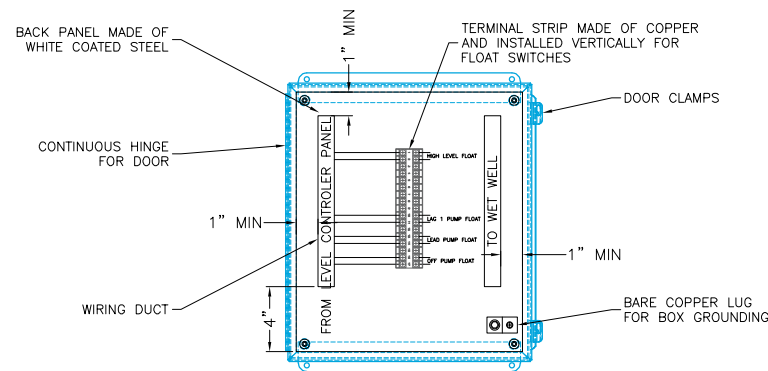
WIRING DUCT FOR PUMP SENSOR WIRING



B CONDUITS, HANGING PLATES AND CONTROL DEVICES

SCALE: N.T.S.

KEY NOTE: ALL CONDUITS SHALL BE PROVIDED WITH END BELL



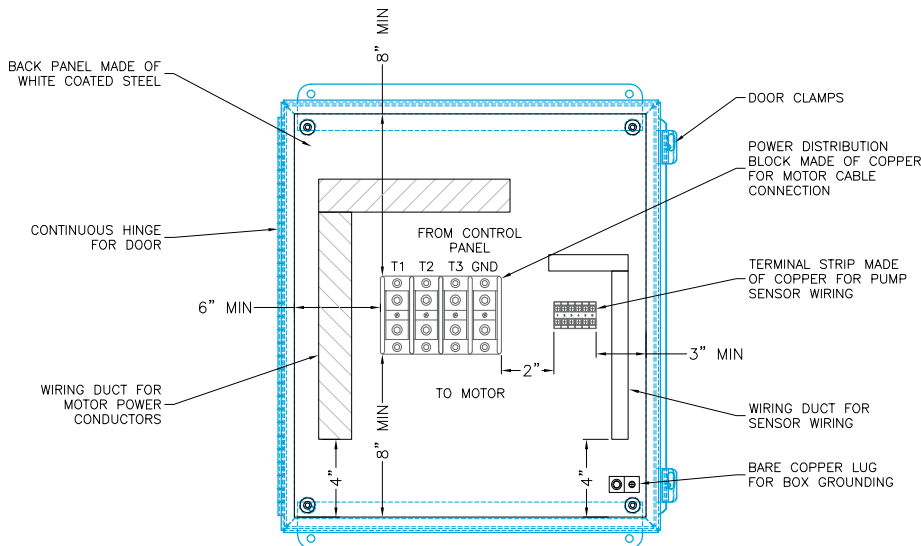
KEY NOTES:

1. THIS JUNCTION BOX DETAIL APPLIES TO ALL JUNCTION BOXES INSTALLED TO CONNECT FLOAT SWITCHES, OR ANY INSTRUMENTATION AND CONTROL DEVICE THAT IS INSTALLED BUT NOT SHOWN ON THESE STANDARD DRAWINGS, IN WHICH THE WIRING CONSIST OF DISCRETE SIGNALS THAT OPERATE AT 120-VAC, OR ANY OTHER VOLTAGE SYSTEM, PROVIDED EACH VOLTAGE SYSTEM HAS ITS OWN DEDICATED JUNCTION BOX.
2. TERMINAL STRIP FOR FLOAT SWITCHES SHALL BE INSTALLED VERTICALLY AND INTUITIVE WITH LEVEL ORDER OF FLOATS. FOR APPLICATIONS OTHER THAN FLOAT SWITCHES, THE TERMINAL STRIP SHALL BE PERMITTED HORIZONTALLY.
3. JUNCTION BOXES SHALL BE SIZED TO MEET THE INTERNAL DIMENSIONS, BASED ON THE REQUIRED SIZE AND NUMBER OF TERMINAL STRIPS, AND THE SIZE AND NUMBER OF WIRING DUCTS, BUT IN NO CASE SHALL THE INSTRUMENTATION AND CONTROL JUNCTION BOXES BE SMALLER THAN 16(H)x12(W)x8(D)-INCHES.
4. SHOWN INTERNAL DIMENSIONS SHALL BE MEASURED FROM EDGE OF BACK PANEL AND NOT FROM THE ENCLOSURE BODY.
5. ALL ALUMINUM CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS AND SHALL BE GROUND.
6. BOND JUNCTION BOX, EACH CONDUIT BUSHING, J-BOX COVER AND BACK PANEL TO GROUND.

E INSTRUMENTATION AND CONTROL JUNCTION BOX INTERNAL DETAIL

SCALE: N.T.S.

WIRING DUCT



KEY NOTES:

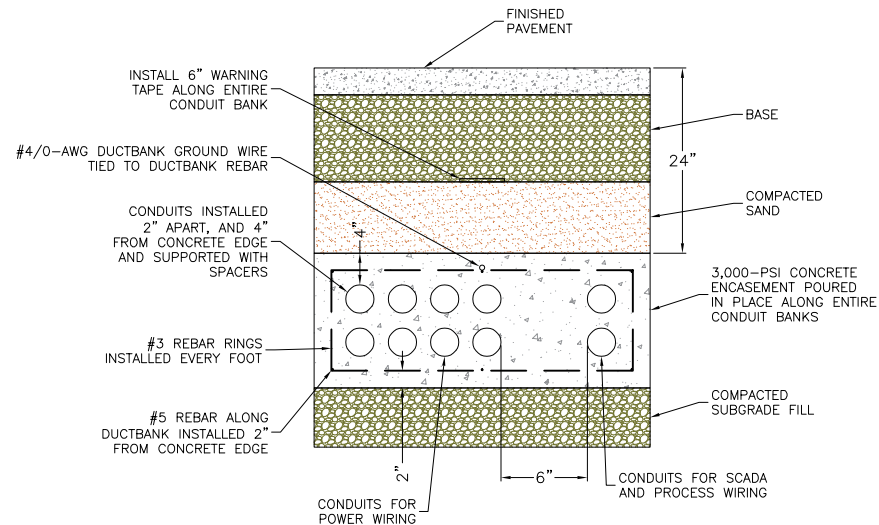
1. THIS JUNCTION BOX DETAIL APPLIES TO ALL JUNCTION BOXES INSTALLED TO CONNECT MOTORS SUCH AS PUMPS, BLOWERS, OR ANY SPECIAL MOTOR APPLICATION REQUIRED BUT NOT SHOWN ON THESE STANDARD DRAWINGS.
2. JUNCTION BOXES SHALL BE SIZED TO MEET THE INTERNAL DIMENSIONS, BASED ON THE REQUIRED SIZE OF POWER DISTRIBUTION BLOCK, WIRING DUCTS AND NUMBER OF TERMINAL STRIPS FOR PUMP SENSOR SIGNALS, BUT IN NO CASE SHALL THE PUMP JUNCTION BOXES BE SMALLER THAN 20(H)x16(W)x8(D)-INCHES.
3. SHOWN INTERNAL DIMENSIONS SHALL BE MEASURED FROM EDGE OF BACK PANEL AND NOT FROM THE ENCLOSURE BODY.
4. POWER DISTRIBUTION BLOCKS SHALL HAVE A SHORT CIRCUIT RATING THAT EXCEED THE MAXIMUM AVAILABLE FAULT CURRENT AT THE SERVICE ENTRANCE.
5. ALL ALUMINUM CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS AND SHALL BE GROUND.
6. BOND JUNCTION BOX, EACH CONDUIT BUSHING, J-BOX COVER AND BACK PANEL TO GROUND.

D MOTOR JUNCTION BOX INTERNAL DETAIL

SCALE: N.T.S.

WIRING DUCT FOR MOTOR POWER WIRING
WIRING DUCT FOR SENSOR WIRING

	WET WELL JUNCTION BOXES DETAILS	
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TRAFFIC RATED COVER

APRON REBAR RINGS ALL AROUND

FINISHED APRON SHALL BE 1/2-INCH ABOVE FINISHED PAVEMENT

FINISHED PAVEMENT

BASE

DUCTBANK COMPACTED SAND

DUCTBANK

SUBGRADE FILL

ALL CONDUITS SHALL TERMINATE WITH BELL END

3"

4"

APRON MUST COVER FULL DEPTH OF HANDHOLE

EXOTHERMIC CONNECTION OF DUCTBANK GROUND WIRES TO HANDHOLE GROUNDING ROD (MINIMUM 30 INCHES BELOW FINISHED GRADE)

Diagram illustrating the components of a conduit seal assembly:

- CONDUIT BODY TYPE C
- GROUNDING CONDUCTOR, 10-INCH LOOP APPROX.
- CONDUIT SEAL
- FINISHED GROUND
- CONDUIT

Diagram illustrating the connection of a lightning rod to a structure. The diagram shows a lightning rod (3/8" THICK STEEL WELDED TO STRUCTURE) mounted on an EQUIPMENT WALL OR STRUCTURE. The rod is connected to a BOLTED CONNECTION (3" x 3") which is secured with #1/0 STRAND SOFT DRAWN BARE COPPER. The rod is also connected to a PVC SLEEVE, which is grounded (TO GROUND CADWELD CONNECTION). The diagram also shows the EQUIPMENT PAD and FINISHED GRADE.

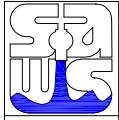
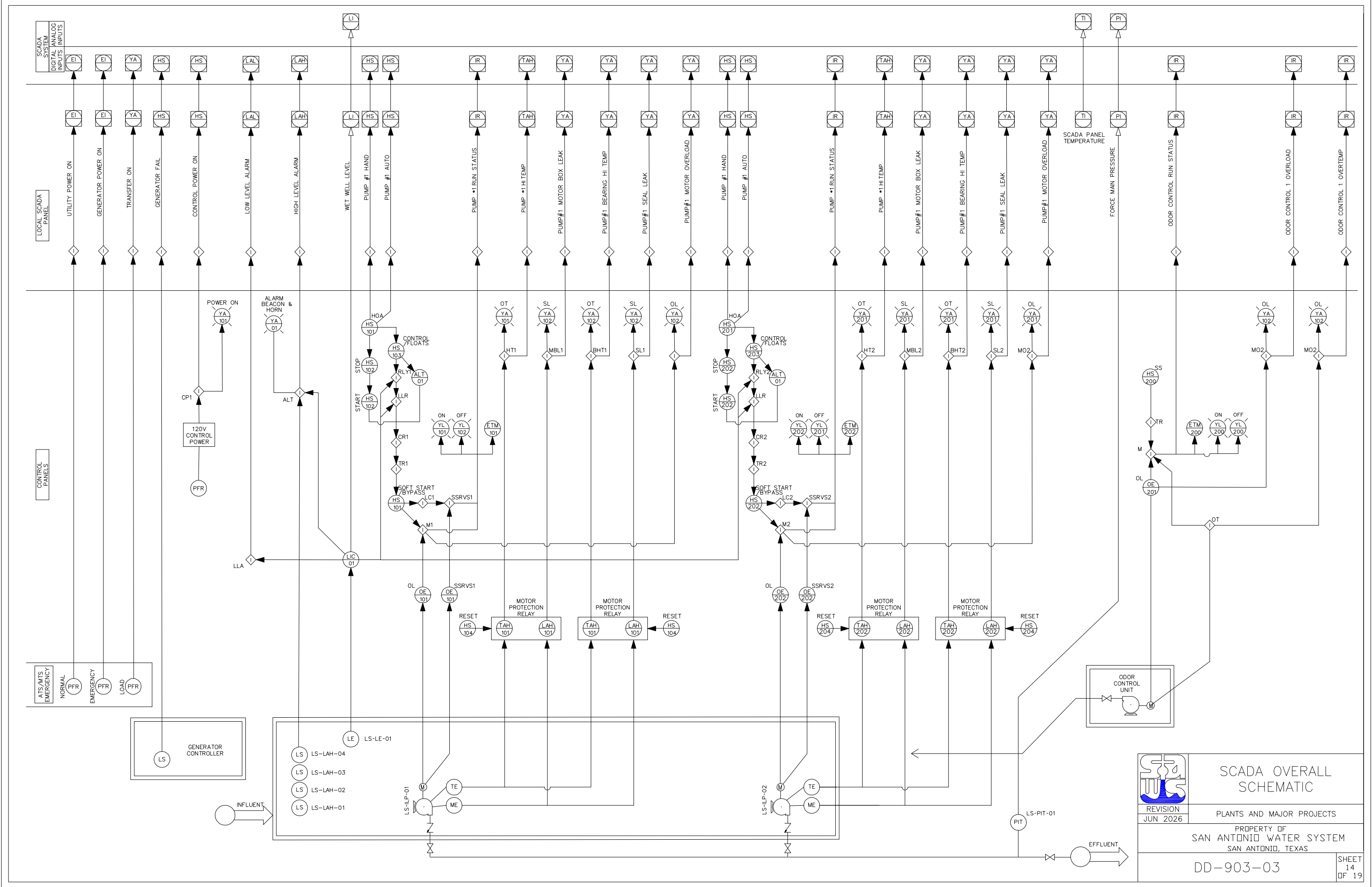
Diagram illustrating a cable to ground rod joint. The diagram shows a cross-section of a cable connected to a ground rod via a bare copper ground wire cadweld. A tee splice is used to connect the cable to the ground wire. The ground wire is labeled "GROUND WIRE TYPICAL". The cable is labeled "CABLE TO GROUND ROD JOINT, BARE COPPER GROUND WIRE CADWELD". The ground rod is labeled "5/8\" x 10' COPPER GROUND ROD". A detail view shows the "CABLE TO CABLE BARE COPPER JOINT GROUND WIRE CADWELD" with a height dimension of 30".

Diagram illustrating the components of a ground test well assembly:

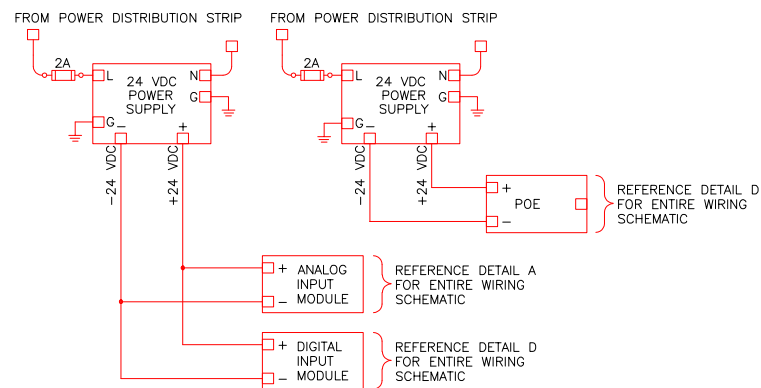
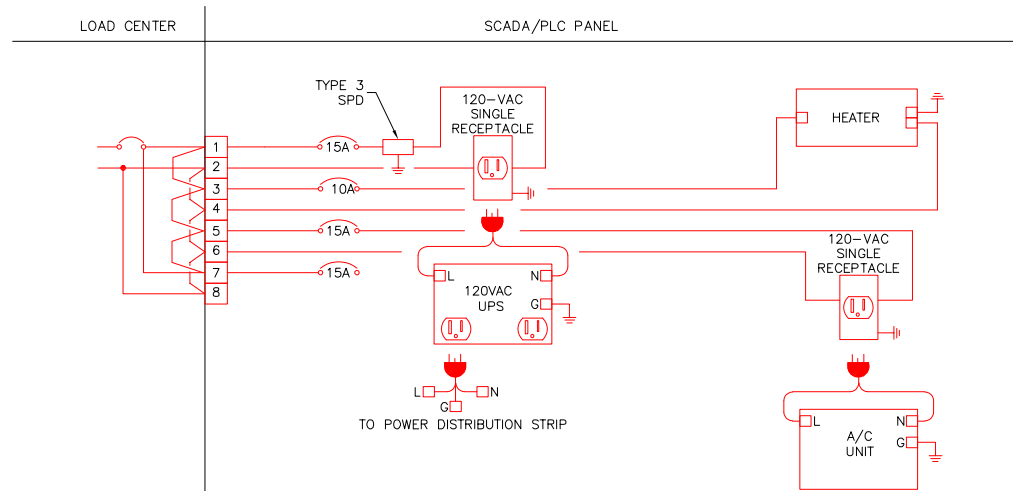
- O.Z. GEDNEY TYPE "ABG" GROUND CLAMP
- DI COVER
- TEST LOOP
- FINISHED GRADE
- BARE COPPER GROUND LOOP
- 12-INCH DIAMETER GROUND TEST WELL
- 5/8" x 10' COPPERWELD GROUND ROD

NOTE:
IF METAL STRUCTURES ARE NOT FURNISHED WITH PROVISION
FOR BOLTED CONNECTION TO GROUNDING SYSTEM, CONTRACTOR
SHALL PROVIDE WELDED PAD FOR GROUND CONNECTION.



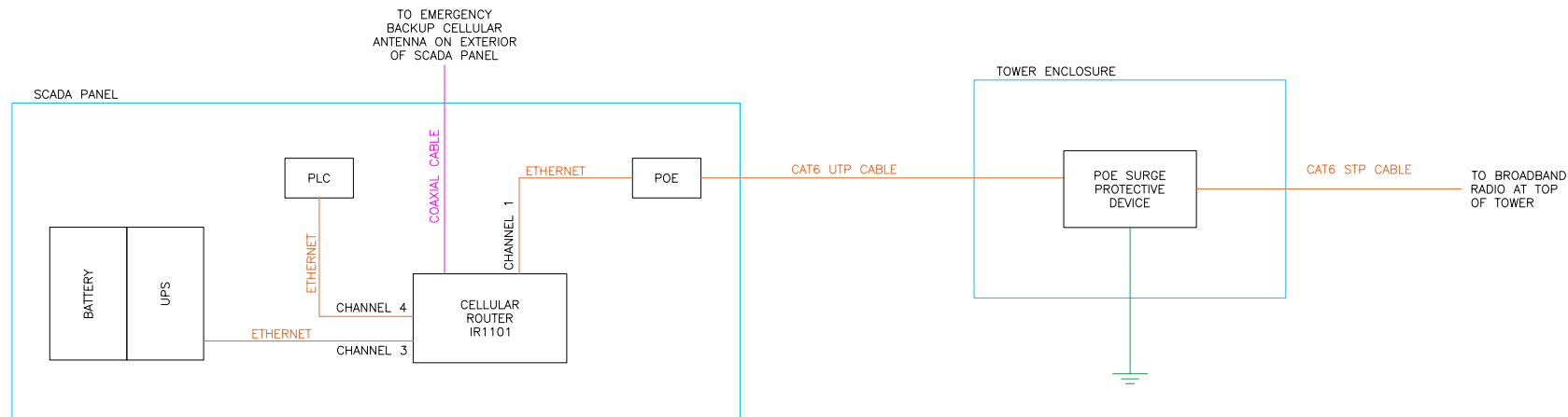


REVISION JUN 2026	SCADA OVERALL SCHEMATIC
PLANTS AND MAJOR PROJECTS	
PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	
DD-903-03	



A SCADA POWER DISTRIBUTION

SCALE: N.T.S.

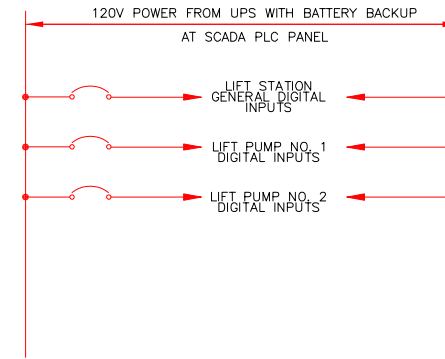


D COMMUNICATION NETWORK DIAGRAM

SCALE: N.T.S.

KEY NOTES:

1. THE ORDER OF THE CONNECTIONS AT THE CHANNELS OF THE ROUTER SHALL BE MAINTAINED FOR STANDARDIZATION PURPOSES. DO NOT ALTER THE ORDER OF THESE CONNECTIONS.

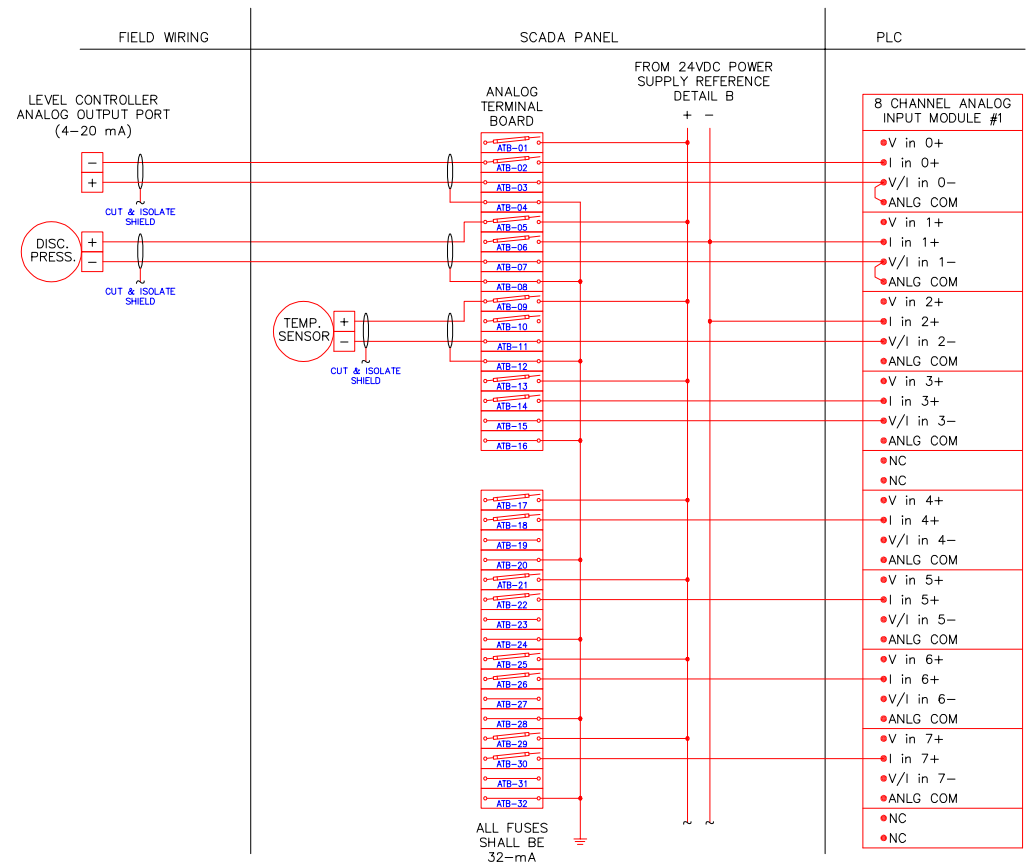


B SIGNAL POWER DISTRIBUTION

SCALE: N.T.S.

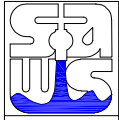
NOTES

1. PROVIDE ONE MINIATURE BREAKER FOR DISCONNECTING MEANS OF THE SIGNAL LOOPS AS SHOWN IN DETAIL B. AN ADDITIONAL MINIATURE BREAKER SHALL BE ADDED FOR EACH ADDITIONAL PUMP INSTALLED. DESIGN ENGINEER SHALL EXPAND THE DRAWING.



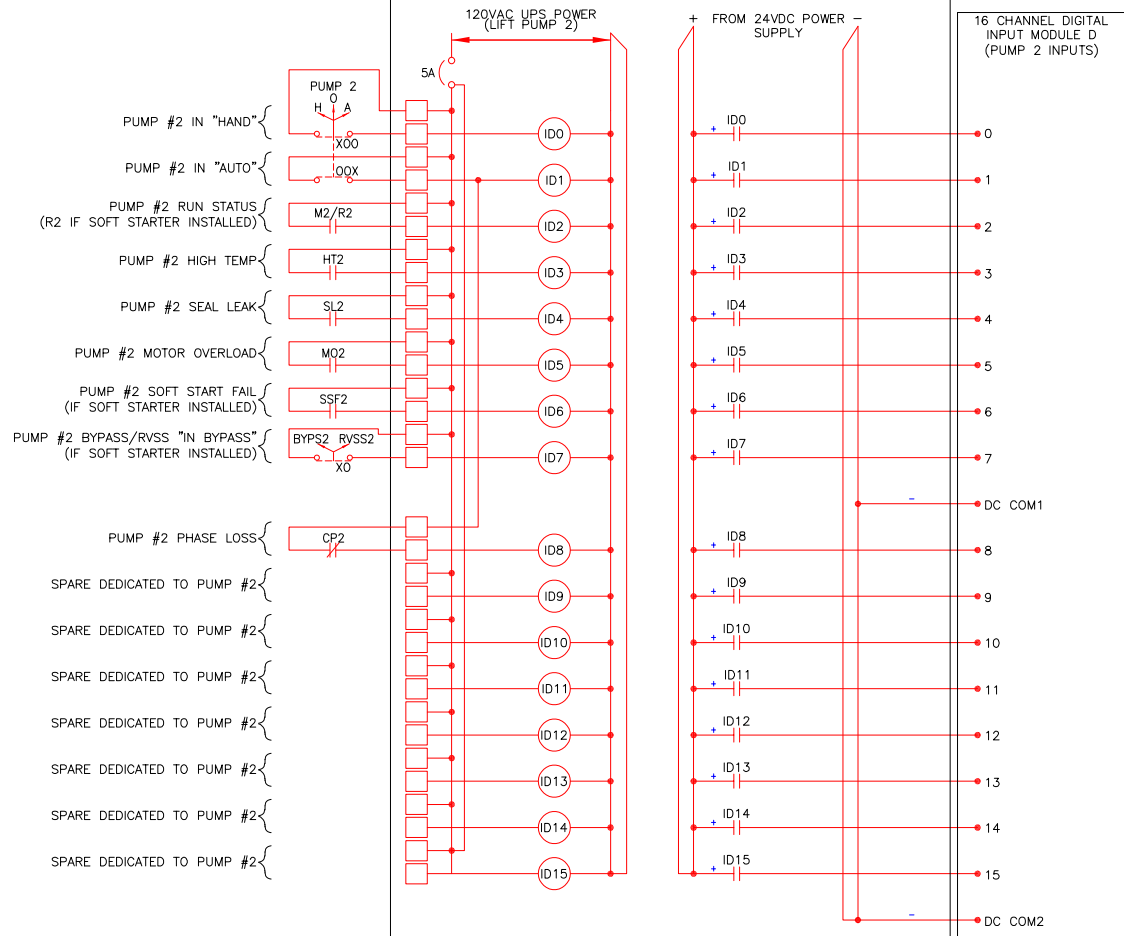
C ANALOG INPUT SIGNALS

SCALE: N.T.S.

	PLC WIRING AND ANALOG INPUTS	
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PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS		
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- LEGEND**
- | | |
|-----|----------------------------------|
| PFR | PHASE FAILURE RELAY |
| GEN | GENERATOR FAULT INDICATION RELAY |
| UPS | UPS FAULT INDICATION RELAY |



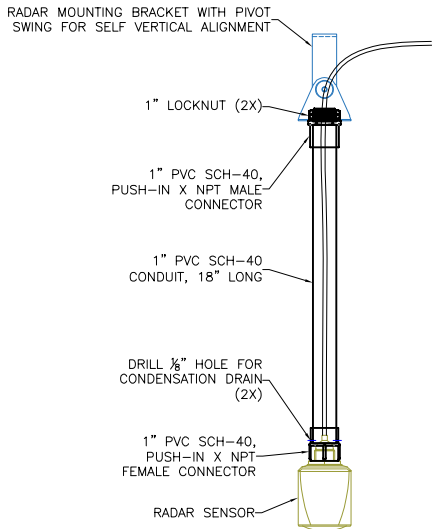
1. ALL INSTRUMENT SIGNAL CABLES (SHIELDED CABLES) SHALL BE CONTINUOUS WITHOUT SPLICES.
2. THE UNINTERRUPTIBLE POWER SUPPLY SHALL BE INSTALLED WITHIN THE SCADA ENCLOSURE WITHOUT INTERFERING WITH ACCESS TO TERMINAL STRIPS, RELAYS, SPACE HEATER OR ANY OTHER TYPE OF DEVICE.
3. THE ENCLOSURE TEMPERATURE TRANSDUCER SHALL BE PROVIDED WITH RTD TO COVER A TEMPERATURE RANGE OF 0 TO 150—°F.
4. ENCLOSURE SHALL BE RATED NEMA 4X, BE MADE OF STAINLESS STEEL 316 AND SHALL BE WHITE ENAMELED COATED.
5. SPACE HEATER SHALL COMPLY WITH MINIMUM SAFETY CLEARANCES ABOUT IT AS INDICATED BY HEATER MANUFACTURER.
6. ALL BROADBAND COMMUNICATION DEVICES REQUIRED SHALL BE INSTALLED IN THE AREA INDICATED.
7. INSTALL ONE ISOLATION RELAY FOR EACH DISCRETE INPUT PROVIDED PER EACH MODULE INSTALLED. EACH DISCRETE INPUT LOOP SHALL BE PRE WIRED FROM TERMINAL BOARD, TO ISOLATION RELAY TO MODULE INPUT CHANNEL. SIMILARLY, INSTALL ONE FUSED TERMINAL BOARD WITH A 32—mA FUSE AND ASSOCIATED NEGATIVE AND GROUND TERMINAL BOARDS FOR EACH ANALOG INPUT CHANNEL PROVIDED BY THE MODULE AND ALSO PRE WIRE THE ANALOG LOOPS.
8. THE ENCLOSURE DOOR SHALL BE PROVIDED WITH AN INTERNAL FOLDING TABLE. AND A POCKET TO STORE WIRING DIAGRAMS AND O&M INFORMATION.
9. BOND THE ENCLOSURE, BACK PANEL AND COVER TO GROUND.



- IMPORTANT NOTES:
- INSULATION REQUIRED FOR ALL ENCLOSURES EQUIPPED WITH A/C UNIT, INCLUDING SCADA ENCLOSURES, LEVEL CONTROL ENCLOSURES AND PUMP CONTROL PANELS WITH SOFT STARTERS.
 - INSTALL INSULATING SHEETS IN THE INTERIOR SURFACES OF THE PANEL, INCLUDING DOOR(S). NOT REQUIRED FOR INTERNAL SWING PANELS.



INCLUDE TOWER NAD83 STATE COORDINATES:
LATITUD: __D__M__S = ____
LONGITUDE: __D__M__S = ____

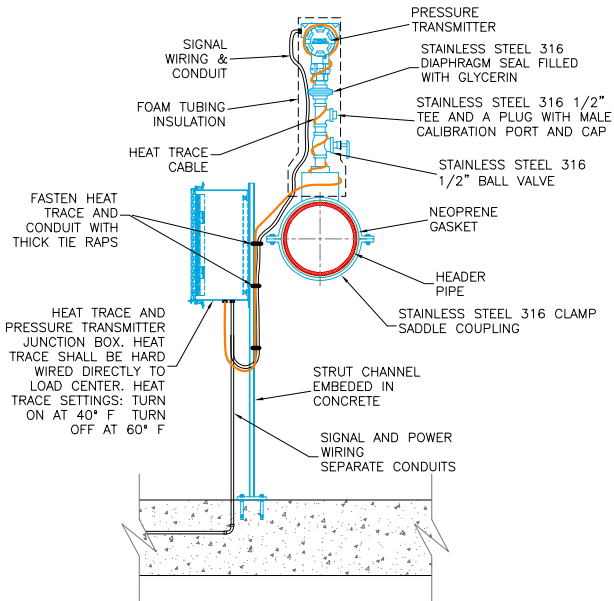


A RADAR LEVEL TRANSDUCER MOUNTING DETAIL

SCALE: N.T.S.

NOTES:

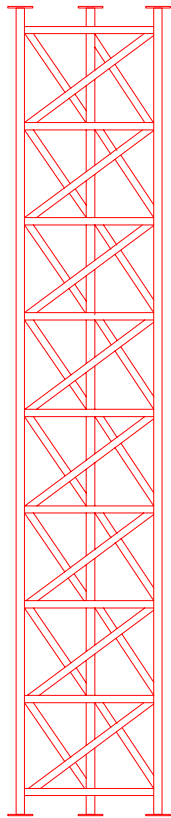
1. ALL METAL COMPONENTS OF THE RADAR INSTALLATION BRACKET SHALL BE MADE OF STAINLESS STEEL 316.
2. MOUNTING BRACKET MUST BE FASTENED TO AN ADJUSTABLE BRACKET ASSEMBLY THAT ALLOWS HORIZONTAL ADJUSTMENT. ADJUSTABLE BRACKET NOT SHOWN AND MUST BE PROVIDED BY DESIGN ENGINEER.
3. THE ADJUSTABLE BRACKET ASSEMBLY MUST BE DESIGNED IN A MANNER THAT THE RADAR TRANSDUCER CAN BE INSTALLED AND REMOVED FROM THE WET WELL WITHOUT THE NEED TO REMOVE FASTENERS. MUST BE PROVIDED WITH MEANS TO BE REMOVED WITH A HOOK.



B DISCHARGE PRESSURE TRANSMITTER MOUNTING DETAIL

SCALE: N.T.S.

NOTE: ALL PIPING NIPPLES AND FITTINGS SHALL BE MADE OF STAINLESS STEEL 316

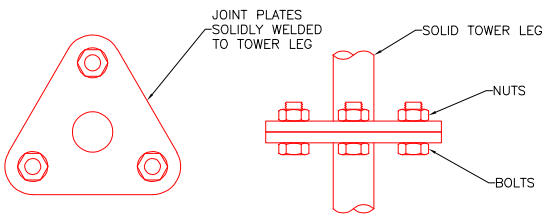


C SCADA TOWER SECTIONS

SCALE: N.T.S.

NOTES:

1. TOWER SHALL BE OF THE FREE STANDING TYPE.
2. THE TOWER LEGS OF THE STRUCTURE SHALL BE SOLID STEEL CAPABLE OF ALLOWING CADCWELDING FOR GROUNDING AND BONDING PURPOSES WITHOUT COMPROMISING THE STRUCTURAL INTEGRITY OF THE TOWER. LEGS MADE OF HOLLOW MATERIAL SUCH AS TUBING SHALL BE PROHIBITED.
3. DESIGN ENGINEER SHALL PERFORM A PHYSICAL RADIO PATH STUDY TO DETERMINE THE REQUIRED ANTENNA HEIGHT, BUT IN NO CASE SHALL BE SMALLER THAN 60-FT.
4. IF A STEADY QUALITY RADIO SIGNAL CANNOT BE ACHIEVED, THE DESIGN ENGINEER SHALL INCLUDE IN THE LIFT STATION DESIGN, THE INSTALLATION OF A NEW BROADBAND ACCESS POINT AT AN EXISTING NEARBY SAWS FACILITY THAT PERMITS A BROADBAND COMMUNICATION LINK.
5. IMPORTANT: DESIGN ENGINEER SHALL PERFORM PHYSICAL RADIO PATH STUDY FROM EXACT LOCATION OF PROPOSED TOWER. GPS COORDINATES OF TOWER SHALL BE SHOWN IN THE PLANS.
6. TOWER SHALL BE PROVIDED WITH FALL SAFETY SYSTEM CABLE MEANS.

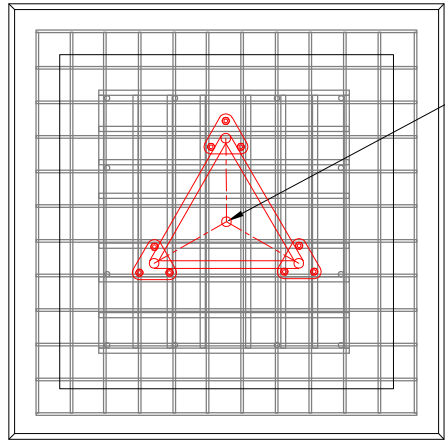


F TOWER SECTION JOINT DETAIL

SCALE: N.T.S.

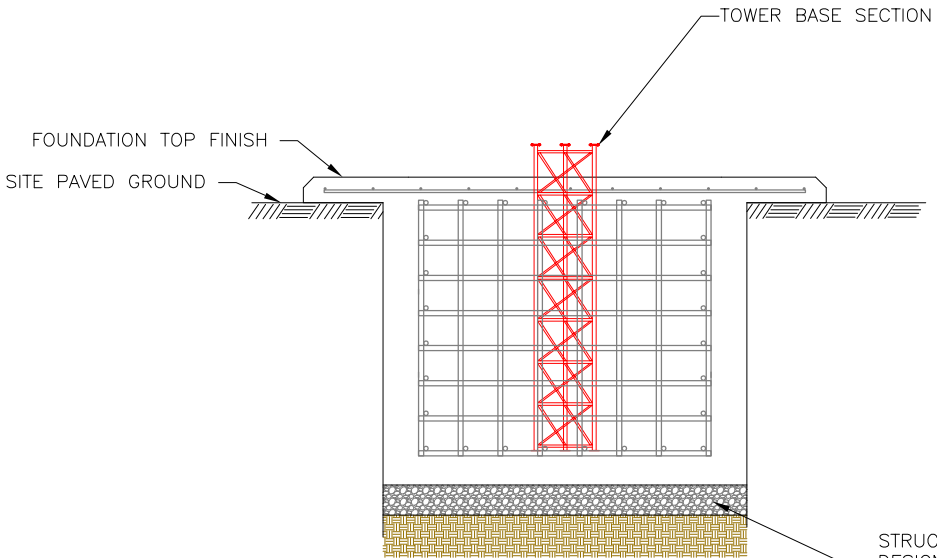
IMPORTANT NOTES:

1. ALL BOLTS FOR TOWERS AND ANTENNAS SHALL BE INSTALLED OUTWARDS AND/OR UPWARDS, UNLESS LACK OF CLEARANCE.
2. ALL BOLTS AND NUTS SHALL BE OF THE HIGH STRENGTH TYPE AND SHALL BE TIGHTENED TO A SNUG-TIGHT CONDITION, AS DEFINED BY AISC.
3. ALL NUTS SHALL BE PROVIDED WITH NUT LOCKING MEANS.



D PLAN VIEW TOWER FOUNDATION

SCALE: N.T.S.



E SIDE VIEW TOWER FOUNDATION

SCALE: N.T.S.

IMPORTANT NOTES:

1. ALL EXPOSED CORNERS AND EDGES SHALL BE CHAMFERED 3/4-INCH.
2. STRUCTURAL ENGINEER IS RESPONSIBLE FOR THE SELECTING THE MOST ADEQUATE FOUNDATION DESIGN FOR THE TOWER.



INSTRUMENTATION AND
TOWER STRUCTURAL
DETAILS

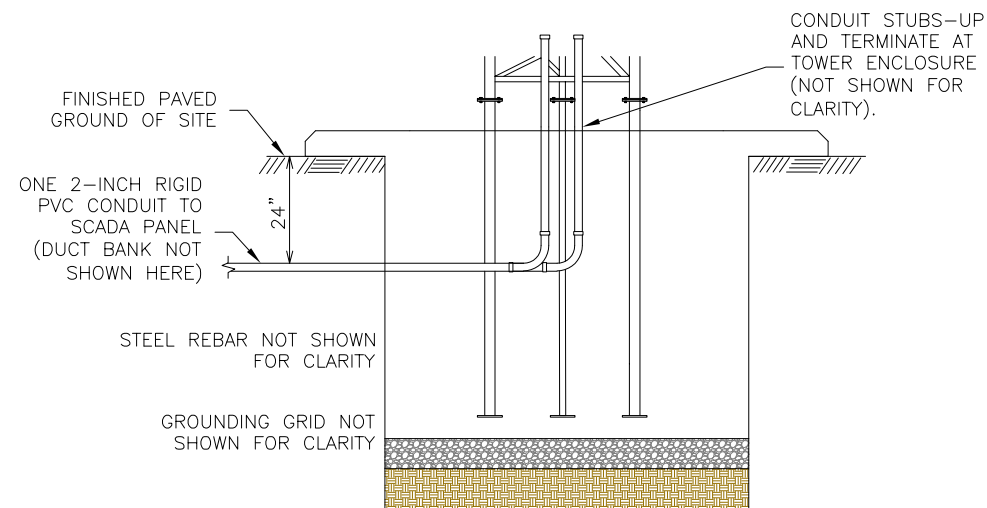
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JUN 2026

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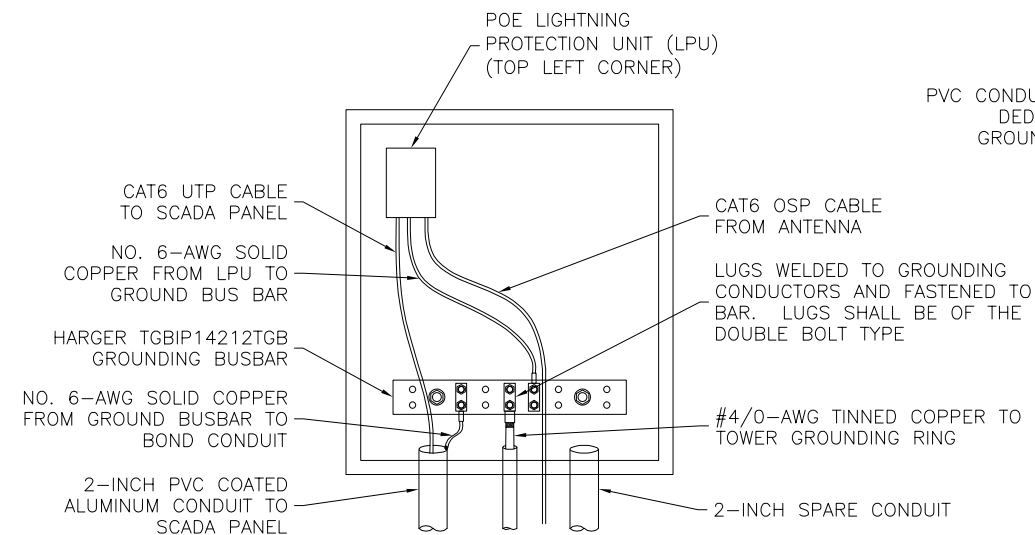
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DD-903-03

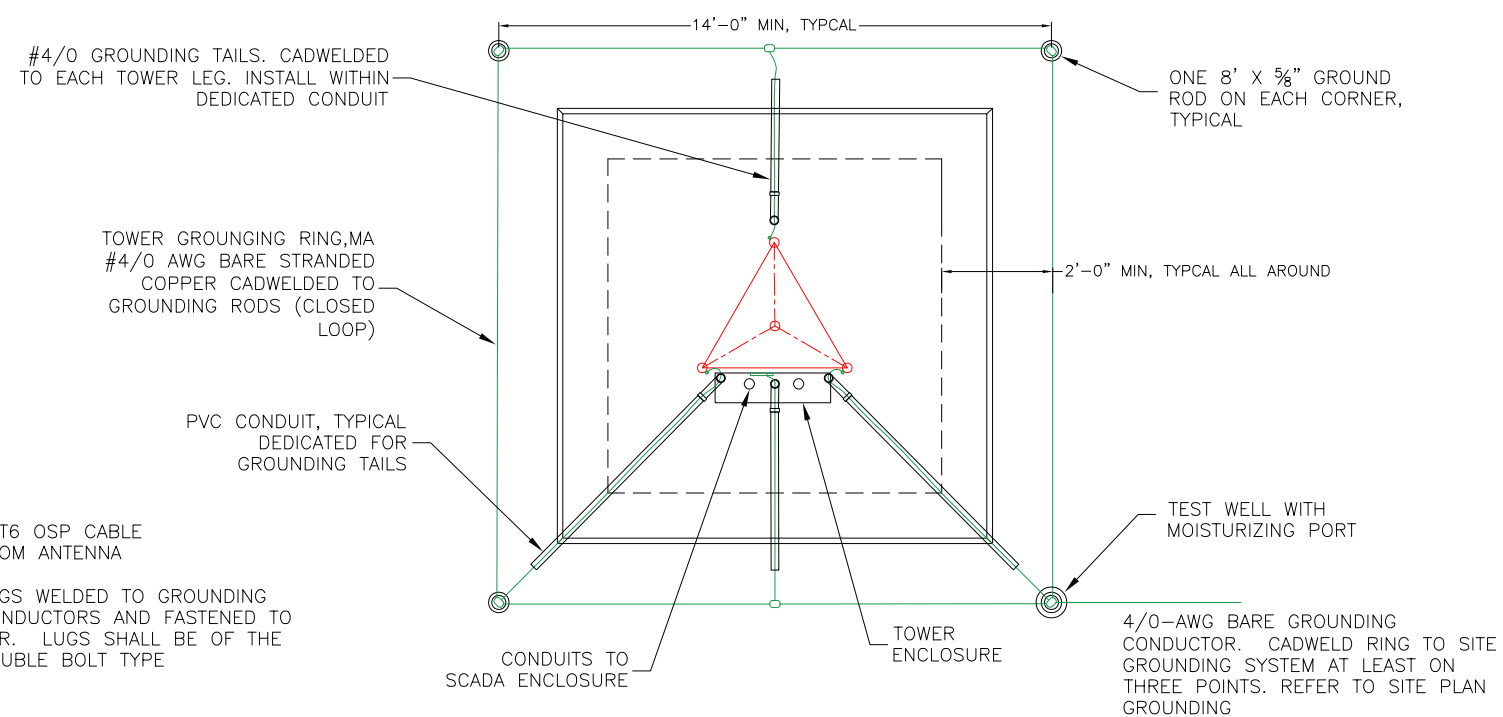
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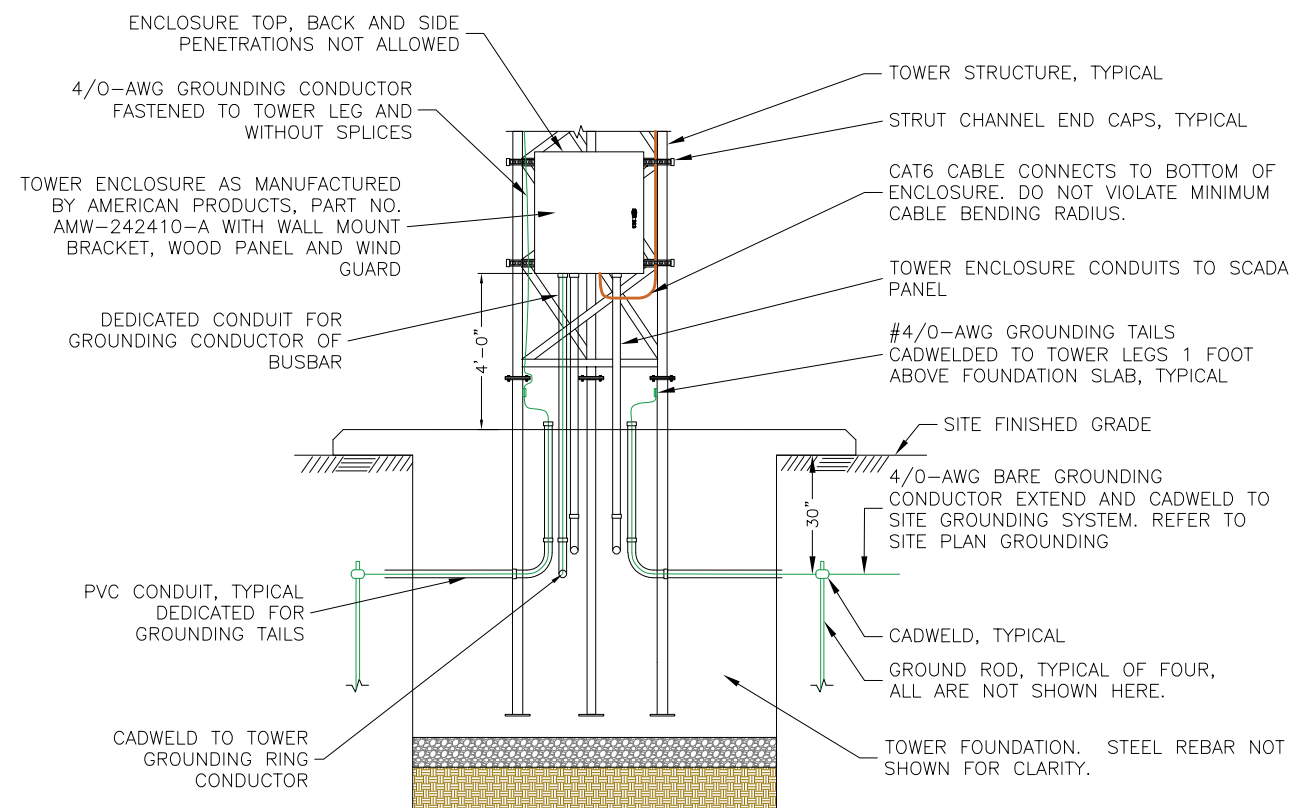
A ANTENNA CABLE CONDUIT RUN
SCALE: N.T.S.



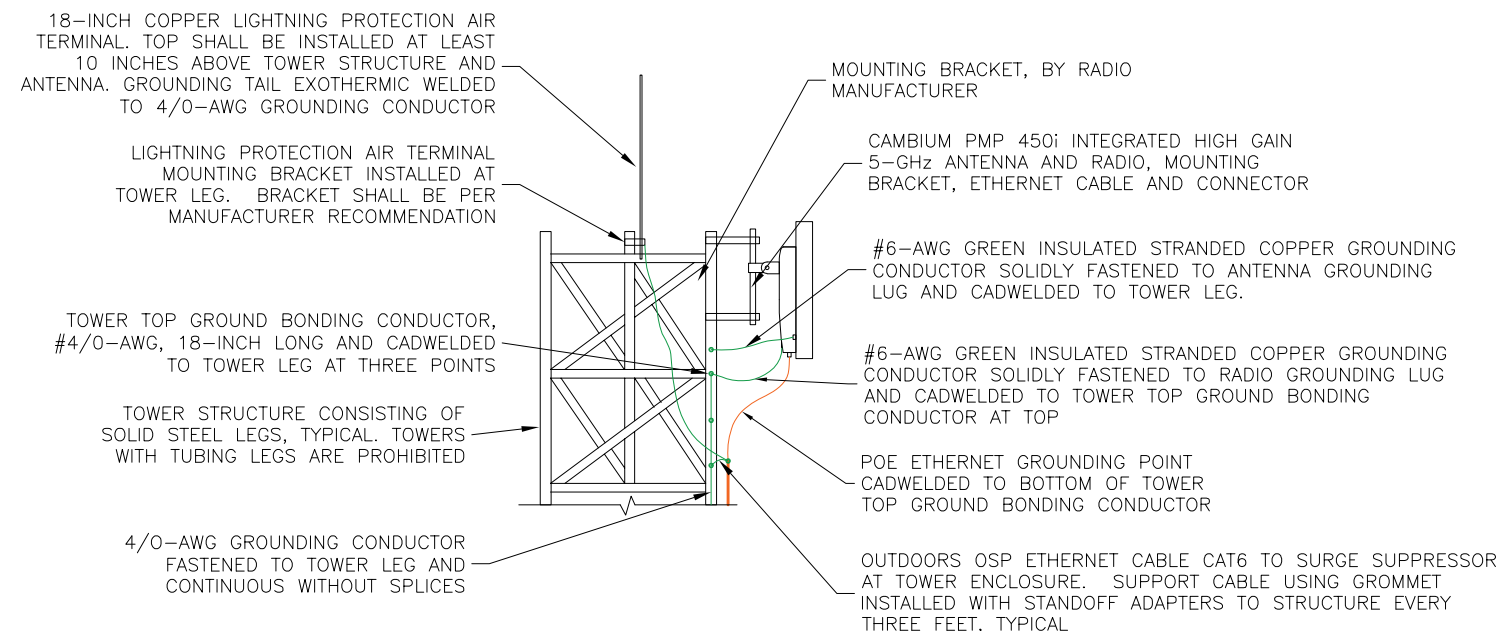
E TOWER ENCLOSURE WIRING DETAIL
SCALE: N.T.S.



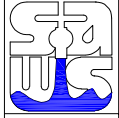
B ANTENNA GROUNDING DETAILS
SCALE: N.T.S.



C TOWER BASE GROUNDING DETAIL
SCALE: N.T.S.



D TOWER TOP GROUNDING DETAIL
SCALE: N.T.S.

	TOWER CONDUIT RUN AND GROUNDING	
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