ADDENDUM NO. 4
14 February 2023

VRL Project No. 2201
Nassau County Sheriff's Office Training Building

The following modifications shall be incorporated into the project specification and drawings.

QUESTIONS RELATING TO THE WATER TREATMENT PLANT (WTP):

Q-1 *Don't see any site phone conduit. What is needed for phone service and is any conduit needed between buildings? Or do we just stub out 5 feet from the main building?*

. A-1 Regarding the Water Treatment Plant phone service, a cell phone based remote automatic telephone dialing system for automatic control and remote monitoring is specified. (See Spec Section 26 0900, Paragraph 2.05)

Q-2 *What rating does the transformer in the treatment plant need to be? Nema 3r, 4x, 12, or standard n1.*

A-2 The Water Treatment Plant transformer shall be furnished with a NEMA 3R rated enclosure. (See Spec Section 26 0905, Paragraph 2.04.L)

Q-3 *MDP for treatment plant shows 200amp on riser but it is being fed from a 100amp enclosed breaker. Can MDP be 100 amp rated or do we need to change the outside breaker?*

A-3 The MDP can be 100 Amp. Please see Addendum Drawing SHT WTP-6.1.

CHANGES TO THE WTP DRAWINGS (With Clouds) :

WTP-6.1 Electrical Single Line Diagram
WTP-6.2 Electrical Plans
WTP-6.3 Electrical Schedules and Details

CHANGES TO THE WTP SPECIFICATIONS (Highlighted) :

Section 26 09 00 Instruments and Controls
Section 33 21 05 Submersible Well Pump and Controls
Section 33 12 33 High Service Pumps and Controls

SECTION 33 1233

WATER TREATMENT PLANT - HIGH SERVICE PUMPS AND CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION The Contractor shall furnish all labor, materials, equipment and supervision for the installation of the high service pumps and controls as drawn and specified. Materials and equipment shall include, but not be limited to end suction, centrifugal, high service pumps with common base and motors, pressure gauges, pressure switches and electrical controls completely factory assembled, ready for use.

A. The high service pumps shall operate by pressure sensing devices connected to the hydropneumatic tank which signal the pumps operation.

1.02 QUALITY ASSURANCE Pump manufacturer/supplier shall have been in business for a minimum of 15 years. Manufacturer shall have a major service center within 150 miles of the project site. Pump service representative shall be available at the site within 24 hours after notification by the Owner.

1.03 SUBMITTALS

A. Shop Drawings: Submit shop drawings and product data for equipment furnished under this Section in accordance with the General Conditions.

C. Operating and Maintenance Manual: Furnish Operation and Maintenance Manuals in accordance the Submittals Section.

D. Equipment Installation Certificate: The Manufacturer shall provide a written report, through the Contractor and endorsed in writing by the Contractor, certifying that the equipment has been properly installed, checked and is ready for placement into routine permanent
service.

1.04 GUARANTEE Submit written agreement from manufacturer/in-staller providing unconditional extended warranty on the pumps and motors. The manufacturer's warranty period shall be for one (1) year after the final acceptance of the equipment by the Owner. The equipment manufacturer shall guarantee that the equipment furnished is suitable for purpose intended and free from defects of design, material and workmanship. In the event the equipment fails to perform as specified, the manufacturer shall promptly repair or replace the defective equipment without any cost to the Owner (including handling and shipment costs.)

1.05 PRODUCT DELIVERY The equipment shall be factory assembled components delivered undamaged to the site. They shall be capable of being set in place and field connected with minimal field assembly.

1.06 MANUFACTURER'S START UP SERVICES Furnish services of manufacturer's technical representative to inspect the completed installation, correct or supervise correction of any defects or malfunctions, and instruct operating personnel in proper operating and maintenance procedures as described in Part 3 of this Section.

PART 2 - PRODUCTS

2.01 HIGH SERVICE PUMPS Two (2) new high service pumps shall be frame mounted, end suction centrifugal suitable for municipal operation. Acceptable pumps: **EBARA Model A3U32160B5HP**, or equal.

A. Pump Operating Characteristics:

1.	Suction Size	2"
2.	Discharge Size	1.25"
3.	Maximum Pump Speed	3,450 rpm

4. Primary Guarantee Point 75 gpm @ 150' TDH
5. Impeller Diameter 6.54”
6. Minimum Efficiency at Primary Guarantee Point 56.3%
7. Maximum Horsepower 7.5 hp

B. Casing: Casing shall be stainless steel or close-grained cast iron with a minimum working pressure of 175 psig. Flanged suction and discharge connections.

C. Impeller: The impeller shall be a one-piece bronze casting of an enclosed double suction type. The impeller shall be dynamically balanced.

D. Shaft: Impeller shaft shall be SAE 1045 carbon steel of size and design to inhibit shaft deflection at the stuffing box to no more than 0.002 inches when the pump is operating at maximum load.

E. Casing Rings: Casing wear rings shall be supplied to maintain proper running clearance with impeller hubs and to minimize leakage between suction and discharge chamber of the casing. Casing rings shall be made of bronze.

F. Bearings: Shall be grease-lubricated ball type. Bearings shall be designed for a minimum ANSI B-10 life of 20,000 hours when the pump is operating at 25% of its best efficiency point capacity for the impeller diameter supplied at the maximum speed of operation.

G. Stuffing Box: The stuffing box shall be provided with throttle bushing, cage ring, packing and provision for discharge blend-off. The stuffing box shall be designed so that it can be re-packed without removing the motor.

H. Coupling: Pump shall be flexibly coupled to the motor. Coupling guard shall be provided.

I. Base: Pump and Motor shall be aligned and mounted on a common steel base.

J. Motors: Pump motors shall be horizontal solid shaft, squirrel-cage, high-efficient type, TEFC, 3,600 rpm with normal starting torque and low starting current characteristics, suitable for three phase, 60 hertz, 230-460 volts, AC electrical current. Motor shall be equipped with corrosion-resistant hardware and space heaters. Each motor shall have a service factor of 1.15 and meet current NEMA B design standards with a cast iron frame and copper windings.

2.02 PRESSURE SENSING DEVICES Furnish and install pressure switches to signal pump operation connected to the hydropneumatic tank as shown in the Drawings and specified herein (See Section 26 0900). Switches shall be either electronic pressure transmitters or mercoid switches. Switches shall be pipe mount devices on a manifold in the High Service Pump Building. Manifold shall include surge protection. Manufacturer shall be responsible for compatibility of signal generation with control panel relays. Provide signal converters as required.

2.03 CONTROL PANEL (See Section 26 0900) Furnish and install a separate, wall mounted control cabinet for the high service pumps and other specified equipment & controls preassembled, pre-wired and including all necessary controls for a complete automated system. ~~The panel shall include, at a minimum, the following:~~

~~A. Enclosure: NEMA 12 enclosure fabricated of 12-gauge minimum thickness steel. Enclosure shall be degreased, cleaned and treated with a phospatizing process; then primed and painted with grey industrial-grade baking enamel.~~

~~B. Dead Front Panel: House in the enclosure a dead front panel with branch circuit breakers, meters, indicating lights, H-O-A switches, and other control switches or devices as required for operation of the high service pumps and auxiliary equipment.~~

~~C. Motor Control (starters, contactors), Starters for 7.5 hp motors shall be part-winding starters or as required by the power company for large starting loads. Due to size, starters may be located in separate NEMA enclosures.~~

~~1. Approved Manufacturers:~~

~~a. Cutler Hammer~~

~~b. Westinghouse Electric~~

~~c. Square D~~

~~d. Or pre-approved equal~~

2. All contactors shall be NEMA, HP rated and bear an U.L. approved label.
3. IEC control not conforming to (2) above will not be accepted due to a reduced life expectancy.
4. Minimum short circuit withstand shall be 22,000 symmetrical amps or as indicated on drawings.

D. Circuit Breakers:
1. Approved Manufacturers:
a. Cutler Hammer
b. Westinghouse Electric
c. Square D
d. Or pre-approved equal
2. Quick make and break operator mechanism.
3. Handle position to indicate on, off, or tripped.
4. Padlock provisions for padlock in OFF position.

E. Terminal Blocks: Terminate all outgoing wires at the numbered terminal strips and identify all wiring with a number code. Terminal strips shall be clear of conduit entry area. General Electric, Type CR151A1 with mounting rack or equal.

F. Elapsed Time Meters: Provide one for each pump, six digit, non-resettable.

G. Pump Alternator: Shall automatically rotate the use of each pump during start up.

H. Pump Start Time Delay: Field adjustable time delay relays for second pump activation to inhibit overload upon start-up shall be provided. The second pump relay shall have minimum time delay of 2 seconds

I. Transformer: Control power transformer 480V,100A,3Ph to 24/V for 24V control relays.

J. Control Relays: 3 PDT, 10A, 24 VAC with clear dust covers and encapsulated coils. Relay functions:
1. Start/stop pump operation
2. Low pressure alarm
3. Alarm silence button

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install all pumps, drive units and accessories in accordance with plans, final shop drawings and manufacturer's data.

B. All work shall be performed, and all materials shall be in accordance with the National Electrical Code and applicable local regulations and ordinances. The contractor shall, at his own expense, arrange for and obtain all necessary permits, inspections, and approval by the proper authorities in local jurisdiction of such work.

C. Electrical work shall be done to conform with the construction schedule and progress of other trades. Electrical apparatus on all equipment shall be handled, set in place, connected, checked out, serviced and placed in readiness for proper operation to the satisfaction of the Owner and Engineer, all within the scope of work intended under this Section.

D. Pump pedestals shall be suitably sized for pump baseplates supplied. Contractor shall construct pump pedestals of the dimensions recommended by the pump manufacturer and as approved by the Engineer. Securement of baseplate to pump pedestal shall also be as recommended by pump manufacturer and as approved by the Engineer.

E. All pump suction and discharge piping, valves and fittings shall be suitably supported and secured in order to eliminate strain on the pump. Piping fittings shall be brought properly together before flange bolts are tightened. Any expansion joints installed must be properly anchored and supported. Obtain recommendation from the pump manufacturer and the expansion joint manufacturer prior to finalizing piping design. Final piping design shall be approved by the Engineer.

3.02 INSPECTION AND TESTING

A. Upon completion of installation, the Contractor, in the presence of the Engineer and a qualified manufacturer's representative, shall test the system to insure the proper operation to the satisfaction of the Engineer.

B. Operating personnel shall be trained in operation and maintenance of equipment at start up. Instruction shall be given in operation, service, adjustments and routine maintenance. Recommended spare lists and maintenance schedules shall be provided.

END OF SECTION

SECTION 26 0900

WATER TREATMENT PLANT - INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.01 SCOPE The work under this Section includes the furnishing of all labor, materials, equipment, and supervision for installation of the instrumentation and control panels as shown in the Drawings and specified herein. Contractor shall be solely responsible for integration of controls/instrumentation with equipment furnished.

1.02 SUBMITTALS

A. Shop Drawings: Submit shop drawings, complete power and control wiring diagrams, and product data for equipment furnished under this Section in accordance with the General Conditions:
   1. Water System Control Panel
   2. Flow Meters
   3. Level Controllers
   4. Pressure Switch Header
   5. Auto Dialer

B. Operating and Maintenance Manual: Furnish Operation and Maintenance Manuals in accordance with Submittals Section.

C. Test Reports: See Paragraph 3.02 A.

1.03 MANUFACTURER'S START-UP SERVICES Furnish services of manufacturer's technical representative to inspect the completed installation, correct or supervise correction of any defects or malfunctions, and instruct operating personnel in proper operating and maintenance procedures as described in Part 3 of this Section.

1.04 UNITARY RESPONSIBILITY In order to unify responsibility, all instrumentation equipment and controls in this and others must be furnished by a single supplier. Instrumentation and controls integrator/supplier shall be responsible for termination of all signal leads to instruments and controls.

1.05 MANUFACTURER/SYSTEM INTEGRATOR The instrumentation and control panel system integrator/supplier shall have 10 or more years of experience in water/wastewater treatment plant applications and shall have successfully completed a minimum of 10 such projects within the past five years. All components of the instrumentation system shall be off-the-shelf products of nationally known manufacturers. Supplier must have an adequately trained staff, be familiar with equipment supplied, and be located within 150 miles of the jobsite in order to provide rapid service at the utility's request. Acceptable: SunState, EQ Controls, or equal.

PART 2 - PRODUCTS

2.01 WATER SYSTEM CONTROL PANEL (WSCP)

A. A NEMA 12 steel, free standing, water system control panel shall be provided to provide automatic control of well pumps, chlorine feed, and high service pumps. The panel shall provide dry run contacts to the well pump controllers at the WTP for operation of onsite equipment as well as receive necessary inputs from onsite equipment and instruments for system operation.

B. The panel shall be provided to operate on 3 phase, 60 hertz, 480-volt AC electrical current. The panel shall be provided with main disconnect breaker, breakers for pumps, control breaker, AC surge protection, phase monitor, control switches, indicator lights, elapsed time meters, and adjustable set point controllers for pump operation. After through-the-door component holes have been punched, but prior to assembly of components, the outside of the panel shall be properly cleaned and painted with a premium quality gloss

white paint. The panel shall be labeled with a serialized UL 508A label. A fuse protected ~~240/120-volt~~ transformer shall be provided for operation of all 120 and/or 24 VDC control circuitry, and all auxiliary equipment.

C. SCCR rating of the control panel shall be as indicated on the Drawings.

D. An open frame, across-the-line, NEMA rated, magnetic motor starter shall be provided for each pump motor. Power contacts shall be double-break cadmium oxide silver. All motor starters shall be equipped to provide under voltage release and overload protection on all three phases. An overload reset button shall be mounted through the dead front door for each motor starter.

E. The panel shall be designed and built to provide the necessary components to safely run and control one well pump, two chlorination feed systems, and two high service pumps as follows:

1. H/O/A switches, call lights, run lights, fail lights, and elapsed time meters shall be provided for each pump.
2. Provide lead and lag automatic control of high service pumps in “Auto” in response to pressure changes as noted by the hydropneumatic tank pressure switch header. Pressure switches will also be provided for the low and high system pressure alarms. Permissive controls will be provided in the Aerator/Ground Storage Tank standpipe level recorder electrodes.
3. Provide automatic alternation of pumps in “Auto”. Pump failure or moving pump selector switch from “Auto” shall take affected pump out of alternation sequence. Make provision to allow any high service pump to always be lead, and any high service pump to always be lag.
4. Provide logic to take a pump out of alternation sequence if pump “faults” or is taken out of “Auto” and go to the next pump in sequence.
5. Provide dry “Run” logic to pump-dedicated chlorine metering pumps when the well pump is running. Logic should be provided to alternate metering pumps.
6. Power and control the Well Pump through the level recorder electrodes located in the standpipe of the Aerator/Ground Storage Tanks (See Paragraph 2.03).

F. As much as possible, the Water System Control Panel shall operate using simple relay logic. Where required for three pump alternation and/or radio communication, small individual PLC’s shall be used. When used, all PLC’s shall be identical and interchangeable. System design shall be such that one PLC can be kept “on the shelf” as a replacement to any PLC in use.

G. Pumps shall be provided with NEMA 4X, oil-tight, LED, red “Alarm” lights, amber “Call” lights, green “Run” lights, H.O.A. switches, and elapsed time meters mounted through the panel outer door.

1. The control panel shall be provided with amber pilot lights to indicate when pumps are called to operate. Lights shall be wired in parallel to the control circuits providing dry run contacts to motor starters or telemetry.
2. The control panel shall be provided with one green pilot light for each pump motor. Circuitry from motor starters or telemetry shall provide closed contact to the Water System Control Panel to indicate that the motor starter is energized.
3. Six-digit elapsed time meters (non-reset type) shall be connected to each motor starter to indicate the total running time of each pump in “hours” and “tenths of hours”.
4. The control panel shall be provided with one “Red” pilot light for each pump to indicate failure. Circuitry from motor starters or telemetry shall provide closed contact to the Water System Control Panel to indicate that the motor starter has tripped.
5. Pump mode selector switches shall be connected to permit manual start and manual stop of each pump individually, and to select automatic operation of each pump. Manual operation shall override all shutdown systems, but not the motor overload relays.

H. Pressure switches (See Paragraph 2.04) shall be Allen Bradley Bulletin 836-C5A, or equal. High and low pressure alarm switches for the pressure header shall have a range from 3-100 psi with an adjustable dead-band from 0.2 to 0.8 psi.

I. Radios and antennas shall be selected by the system integrator to provide uninterrupted service.

J. All systems with radios and/or PLCs shall be protected by uninterrupted power sources capable of providing a minimum 4-hour operation without AC power.

2.02 FLOW METERS

A. Electromagnetic Flowmeter (FE/Fit 200)

1. Electromagnetic flowmeter shall be of the pulsed DC short-form design utilizing electromagnetic induction to produce a 4-20 mA analog and a scaled pulse output signal directly proportional to flow, in one direction only.
2. Metering tube shall be constructed of Type 304 stainless steel with a 200°F rated fusion bonded epoxy liner and ANSI 150# carbon steel flange end connections. Electrodes shall be Type 316 stainless steel.
3. Electromagnetic flowmeter shall be NEMA 6P/IP68 rated. Meters shall be capable of accidental submergence up to 30', and continuous submergence up to 6'.
4. Meter shall be equipped with 316 stainless steel grounding rings and all necessary signal cable.
5. Flowmeter shall be hydraulically calibrated, and computer printouts of the actual calibration data shall be furnished with each meter.
6. Electromagnetic flow transmitters shall be of the feedback type utilizing solid-state printed circuit construction and shall be provided with low flow cutoff circuitry for positive return to zero during no flow conditions.
7. Each transmitter shall be remote mounted. Flow transmitter housings shall be NEMA 4 cast aluminum. Transmitters shall be equipped with a full-scale indicating meter and observation window.
8. Electromagnetic flowmeter accuracy shall be ±0.5% full scale for the range indicated.
9. Electromagnetic flowmeter shall match Endress+Hauser Proline Promag W 300 or approved equal.

B. Ultrasonic Flowmeter (FE/Fit 100)

1. Ultrasonic flowmeter and accessories shall be installed as indicated on the plans and shall be of the pipe strap-on or clamp-on type for water flow measurement.
2. Ultrasonic flowmeter shall match Flexim FLUXUS F501 or approved equal.
3. Transducer shall be 316 stainless steel and of the PermaRail or quick release clasp mounting type.
4. Flow measurement shall be based on the transit time difference correlation principle. Flow velocity accuracy shall be ±0.03 ft/s and volumetric flow measurement accuracy shall be ±1.5% for the range indicated.
5. Flow transmitters shall be of the feedback type utilizing solid-state printed circuit construction and shall be provided with low flow cutoff circuitry for positive return to zero during no flow conditions.
6. Transmitter shall be NEMA 4 rated with digital display. Fixation shall be wall mounted or 2" pipe mounted adjacent to transducer. Housing material shall be powder coated aluminum.
7. Flowmeter shall provide pulsed DC 4-20 mA analog output.
8. Flowmeter shall be hydraulically calibrated in coordination with the setpoint of the submersible well pump.
9. Meter shall be equipped with 316 stainless steel grounding rings and all necessary signal cable.

2.03 LEVEL CONTROLLERS Level controllers shall be included in the standpipe connected to the aerator/ground storage tanks to control the well pump operation based on water level in the tanks.

A. Level controllers shall utilize suspended electrodes, electrode holders, and induction relays. Electrodes, electrode holders, suspension wire, and induction relays shall be manufactured by B/W Controls, Warrick Controls, or equal. Products manufactured by B/W Controls are used to describe the required functions of each level control system below.

B. Wire suspension electrodes shall utilize a stainless-steel electrode that is assembled inside a molded plastic shield that is approximately 2 inches long and 9/16-inch in diameter. Electrodes shall be B/W Controls Catalog No. 6013-W6 with No. 6013-SW suspension wire.

C. Electrode holders shall be watertight and suitable for exterior locations. Electrode holders shall be cast iron and shall be flanged for attachment to the tank or structure nozzle. The electrode holders shall be sized to accommodate the number of electrodes and shall have a removable inner plate with a grommet for each electrode that provides a vapor tight fit. Electrode holders shall be B/W Controls Catalog No. 6012-E554.

D. Induction relays shall utilize a 120 VAC power supply and shall have a secondary coil voltage of 220 VAC. Induction relays shall have contact arrangements described below.

E. Aerator/Ground Storage Tank Level Controller: Controller shall be located in the Water System Control Panel. Electrodes and induction relays shall be selected and arranged to provide the following functional requirements:

1. Lockout/Reset of High Service Pumps
   - One electrode, reset: Standpipe Water Level: 1 ft (51.3 NGVD)
   - One electrode, lockout: Standpipe Water Level: 0.5 ft (50.8 NGVD)
   - One 1500-F relay
2. Run/Stop Well Pump
   - Two Electrodes
   - One, stop: Standpipe Water Level: 5.25 ft (55.6 NGVD)
   - One, run: Standpipe Water Level: 2.60 ft(52.9 NGVD)
   - One 1500-D relay
3. Grounding Electrode
   - One electrode

2.04 PRESSURE SWITCH HEADER

A. A welded 2" Schedule 40S stainless steel pressure control header shall be provided with welded ½" FPT bosses for pressure switches, pressure gauge, spare, and pressure inlet and drain. Pressure inlet and drain shall be provided with 316 stainless steel 1/2" ball valves. Pressure switches and gauge shall be installed with stainless steel unions for ease of service. ¼" flexible hose with bushing connections shall be provided as shown in the Drawings for hydraulic surge control.

B. A 4" diameter, glycerin filled pressure gauge with stainless steel case and internals shall be mounted on the header. The pressure gauge shall be provided with a dial calibrated in psig, accuracy shall be +/- 0.5%.

C. The controller shall be located in the Water System Control Panel and shall read air pressure in the hydropneumatic tank from the pressure switch header. It shall start the high service pumps at selected pressures and stop them when the high-water level in the tank is reached. The controller shall alternate the high service pumps after each cycle.

D. A fall in tank pressure to an adjustable, pressure switch setpoint (initial setpoint of 55 psig) shall start the lead pump. When the high-water level is reached, the pump shall stop. If the tank pressure is below an adjustable predetermined setpoint, the Air Rite air compressor will also add air to the tank (See section 33 1613).

E. With the lead pump already operating, should the pressure fall below an adjustable, pressure switch setpoint (initial setpoint of 50 psig), the lag pump shall start and run in parallel with the lead pump. Both pumps shall stop when the high-water level is reached and, if necessary, air shall be added to the tank as previously described.

F. The controller shall have interposing relays for the following:
1. Run/stop of Pump No. 1
2. Run/stop of Pump No. 2
3. Low pressure alarm input to the telephone dialer. This adjustable, pressure switch setpoint shall have an initial setpoint of 45 psig.

G. Pressure switches shall be Allen Bradley Bulletin 836-C5A or equal. Setpoints shall be as follows:

Pressure Switch No. 1: High Pressure, Pumps Off	Open 67 PSI	Close 65 PSI
Pressure Switch No. 2: Run lead Pump, HSP 1	Open 60 PSI	Close 55 PSI
Pressure Switch No. 3: Run Lag Pump, HSP 2	Open 60 PSI	Close 50 PSI
Pressure Switch No. 4: Low Pressure Alarm	Open 47 PSI	Close 45 PSI

2.05 CELL PHONE SCADA

A. ~~Two Antx~~ Cattron AQUAVX, or equal, cell phone based remote automatic telephone dialing systems shall be provided for automatic control and monitoring of remote wells, continuous monitoring of faults, and collection of archive data for reports and notification of personnel of critical alarms. Units shall be either panel/flush mount for the elevated tower or NEMA 4X fiberglass composite with clear-view cover for the water plant. Each unit shall include:

1 A digital display for viewing inputs and outputs.
1 Keypad for local programming.
4 Analog inputs.
10 Digital dry contact inputs.
2 Digital relay outputs.
20 Modbus digital inputs.
30 Modbus analog inputs.
8 Modbus Digital outputs.
AT&T or Verizon cellular modem.
120-hour solar battery backup.

B. Web-based software alarm notification, monitoring and data collection, and storage shall be provided including:
1. Custom alarm notification; voice, text, or email.
2. Storage of all input data for easy viewing as data or graphs user composed for optimum use.
3. Relay output control.

C. WTP Alarm Inputs to Include:
1. Low Level Aerator/Ground Storage Tanks.
2. High Level Aerator/Ground Storage Tanks.
3. Low System Pressure Alarm.
4. Chlorine Feed Pump Fail/Low Chlorine Solution Flow or Level.
5. Well Pump Fail.
6. WTP Loss of Utility Power.
7. Spare.
8. Spare.
9. Spare.
10. Spare.

~~**2.06 DIALER ALARM RECEIVER PANEL**~~

~~A. NEMA 4X fiberglass hinge cover dialer input panel shall be provided with separate input and out terminal strips to receive all dialer inputs, input signal line surge protection, and provide protected outputs to the telephone dialers at the WTP. AC and signal line surge~~

~~protection shall be as called for in Paragraph 2.07 below. Telephone line surge protection shall be as recommended by dialer manufacturer.~~

2.06 SURGE PROTECTION

A. Automatic transient protection shall be provided for all 120-volt AC power and signal lines to instrumentation and controls. All field protection devices shall be provided installed within NEMA 4X stainless steel enclosures. The devices shall react to transients with switching speeds of less than one nanosecond. Protection shall be provided for both positive and negative transients. An indicator light shall indicate proper working condition for the device.

B. AC surge protection for peak surge currents to 39,000 amps per phase. They shall be four stage hybrid circuit design with user replaceable fusing. They shall provide protection L-N, L-G, N-G. The protector shall include EMI/RFI filtering to >56 dB, 100 kHz, 100 MHZ with LED indicator lights for ground presence, ground fault indication, and fuse status.

C. Signal line surge protection shall be capable of maximum surge currents to 2,000 amps per pair with a continuous rating of 5 amps and a clamp voltage of 47 volts.

2.07 EQUIPMENT GROUNDING Copper, earth ground rods shall be provided by the electrical contractor within 10' of all field instruments and control panels with a resistance of 25 ohms or less.

2.08 SPARE PARTS: The following spare parts shall be provided, individually packaged in a water/dust resistant plastic enclosure for delivery to the City personnel at equipment start-up.

QUANTITY	DESCRIPTION
2	Relays each size/model
6	LED lamps each color
6	Fuses each size
1	PLC

PART 3 - EXECUTION

3.01 PROCESS CONNECTIONS

A. All field terminations at instruments and telemetry units shall be provided by instrument integrator.

B. Prior to start-up, the instrument integrator must provide through the Contractor documentation that all wiring has been terminated and tested to ensure proper connections.

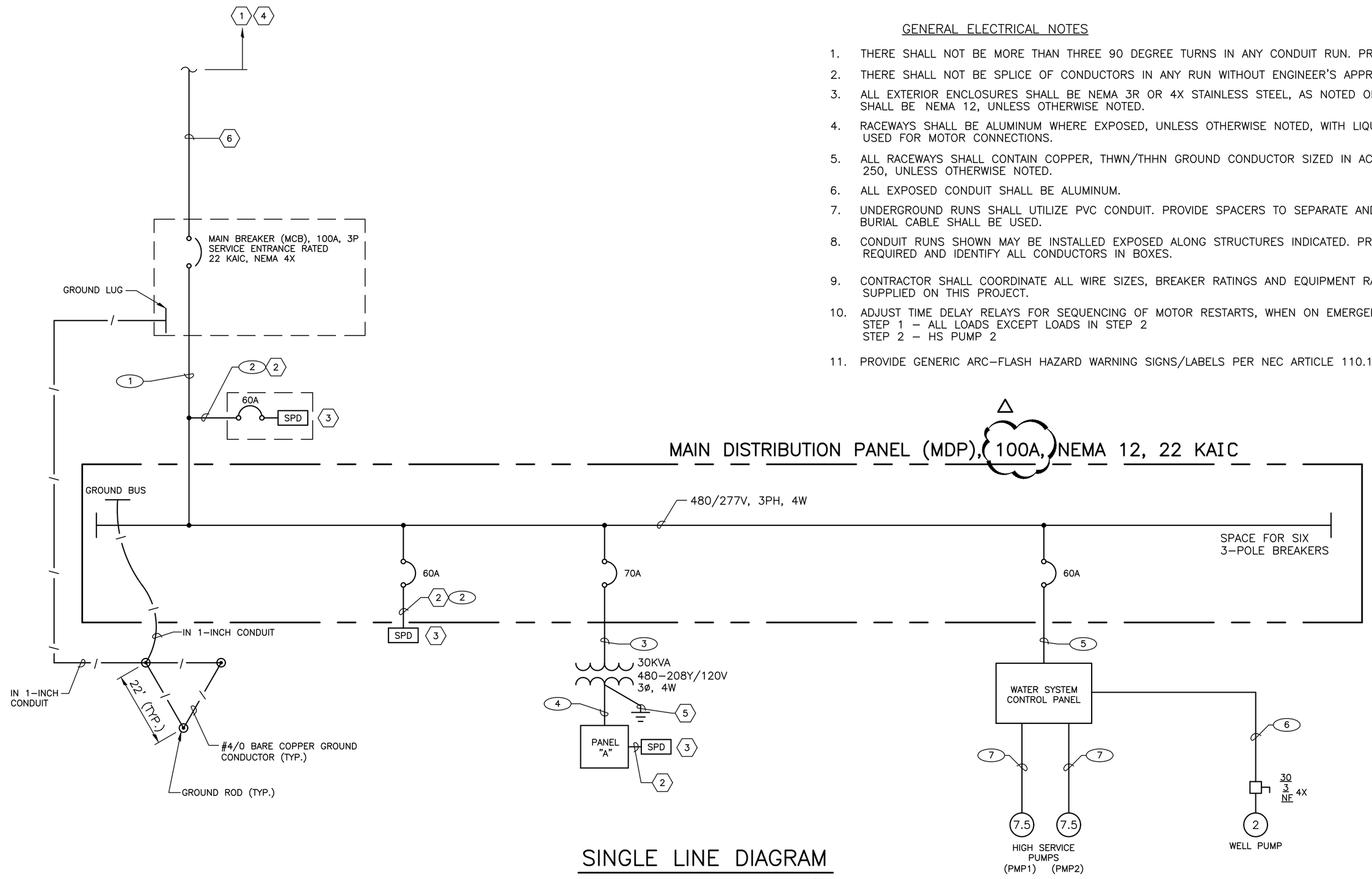
C. Prior to start-up, the instrument integrator shall calibrate all instruments and provide a written report for each instrument detailing the calibration set points.

3.02 INSPECTION AND TESTING

A. Upon completion of installation, the Contractor, in the presence of the Engineer and a qualified manufacturer's representative, shall test the system to ensure the proper operation to the satisfaction of the Engineer. Provide test reports for all systems.

B. Operating personnel shall be trained in operation and maintenance of equipment at start-up. Instruction shall be given in operation, service, adjustments, and routine maintenance.

END OF SECTION



SINGLE LINE DIAGRAM

NTS

GENERAL ELECTRICAL NOTES

1. THERE SHALL NOT BE MORE THAN THREE 90 DEGREE TURNS IN ANY CONDUIT RUN. PROVIDE PULLBOXES AS REQUIRED.
2. THERE SHALL NOT BE SPLICE OF CONDUCTORS IN ANY RUN WITHOUT ENGINEER'S APPROVAL.
3. ALL EXTERIOR ENCLOSURES SHALL BE NEMA 3R OR 4X STAINLESS STEEL, AS NOTED ON DRAWINGS. ALL INTERIOR ENCLOSURES SHALL BE NEMA 12, UNLESS OTHERWISE NOTED.
4. RACEWAYS SHALL BE ALUMINUM WHERE EXPOSED, UNLESS OTHERWISE NOTED, WITH LIQUIDTITE FLEXIBLE METAL CONDUIT USED FOR MOTOR CONNECTIONS.
5. ALL RACEWAYS SHALL CONTAIN COPPER, THWN/THHN GROUND CONDUCTOR SIZED IN ACCORDANCE WITH THE NEC, ARTICLE 250, UNLESS OTHERWISE NOTED.
6. ALL EXPOSED CONDUIT SHALL BE ALUMINUM.
7. UNDERGROUND RUNS SHALL UTILIZE PVC CONDUIT. PROVIDE SPACERS TO SEPARATE AND SUPPORT CONDUITS. NO DIRECT BURIAL CABLE SHALL BE USED.
8. CONDUIT RUNS SHOWN MAY BE INSTALLED EXPOSED ALONG STRUCTURES INDICATED. PROVIDE JUNCTION BOXES WHERE REQUIRED AND IDENTIFY ALL CONDUCTORS IN BOXES.
9. CONTRACTOR SHALL COORDINATE ALL WIRE SIZES, BREAKER RATINGS AND EQUIPMENT RATINGS TO MATCH EQUIPMENT SUPPLIED ON THIS PROJECT.
10. ADJUST TIME DELAY RELAYS FOR SEQUENCING OF MOTOR RESTARTS, WHEN ON EMERGENCY POWER, IN THE FOLLOWING STEPS:
    STEP 1 – ALL LOADS EXCEPT LOADS IN STEP 2
    STEP 2 – HS PUMP 2
11. PROVIDE GENERIC ARC-FLASH HAZARD WARNING SIGNS/LABELS PER NEC ARTICLE 110.16.

SPECIFIC NOTES:

1. COORDINATE ALL INCOMING SERVICE WORK WITH TRAINING BUILDING ELECTRICAL WORK.
2. SHORTEST POSSIBLE CONDUCTOR LENGTH.
3. UL 1449 THIRD EDITION, TYPE 2, 240 KA SURGE CURRENT CAPACITY PER PHASE, 200 KA SCCR, WITH SURGE COUNTER AND 10-YEAR WARRANTY.
4. UNDERGROUND SECONDARY BURIED MINIMUM OF 30-INCHES BELOW GRADE. PROVIDE WARNING TAPE 12-INCHES BELOW GRADE. PROVIDE LONG RADIUS SWEEPS. TRANSITIONS OF CONDUIT FROM UNDERGROUND TO ABOVEGROUND SHALL BE MADE WITH PVC COATED RIGID GALVANIZED STEEL CONDUIT.
5. PROVIDE GROUNDING PER NEC.
6. SEE SHEET E-2 FOR FEEDER INFORMATION & FOR ELECTRICAL SITE PLAN.

CABLE AND CONDUIT SCHEDULE	
1	3#2,1#2N,1#6G-2½"C △
2	4#6-1"C
3	4#4-1½"C
4	3#3,1#2G-¾"C
5	4#4-1½"C
6	4#10-¾"C
7	4#10-¾"C
8	NOT USED
9	NOT USED

ABBREVIATIONS	
A/GSTLC	AERATOR/GROUND STORAGE TANK LEVEL CONTROLLER
ATS	AUTOMATIC TRANSFER SWITCH
CFWE	CABLE FURNISHED WITH EQUIPMENT
CPT	CONTROL POWER TRANSFORMER
ETM	ELAPSED TIME METER
FVNR	FULL VOLTAGE NON REVERSING STARTER
GFCI	GROUND FAULT CIRCUIT INTERRUPTOR
GW	WEATHER PROOF WITH GFCI
HOA	HAND-OFF-AUTO
IE	INSTRUMENT ENCLOSURE
MCP	MOTOR CIRCUIT PROTECTOR
MDP	MAIN DISTRIBUTION PANEL
MLO	MAIN LUGS ONLY
MSH	MOTOR SPACE HEATER
PM	PHASE MONITOR
PCP	PLANT CONTROL PANEL
SCCR	SHORT CIRCUIT CURRENT RATING
SOSO	SEQUENCE ON SIMULTANEOUS OFF
SPD	SURGE PROTECTIVE DEVICE
TD	TIME DELAY ON ENERIZATION
TSP	TWISTED SHIELDED PAIR, COPPER
UON	UNLESS OTHERWISE NOTED
WCR	WITHSTAND AND CLOSING RATING
WSCP	WATER SYSTEM CONTROL PANEL

LEGEND	
(X)	CABLE AND CONDUIT IDENTIFIER
◀	VOICE/DATA OUTLET BOX
	DUPLEX RECEPTACLE, 120 VOLT, 20 AMP
$	SWITCH
(E)	EQUIPMENT CONNECTION
(J)	JUNCTION BOX
———	EXPOSED CIRCUIT
— — —	CONCEALED CIRCUIT
—·—·—	MULTIPLE CIRCUITS
	DISCONNECT SWITCH – AMPS/POLE/ENCLOSURE
	MANUAL COMBINATION STARTER
	CIRCUIT BREAKER
	FUSE
	TRANSFORMER
(7.5)	MOTOR WITH HORSEPOWER SIZE

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0206-17-1

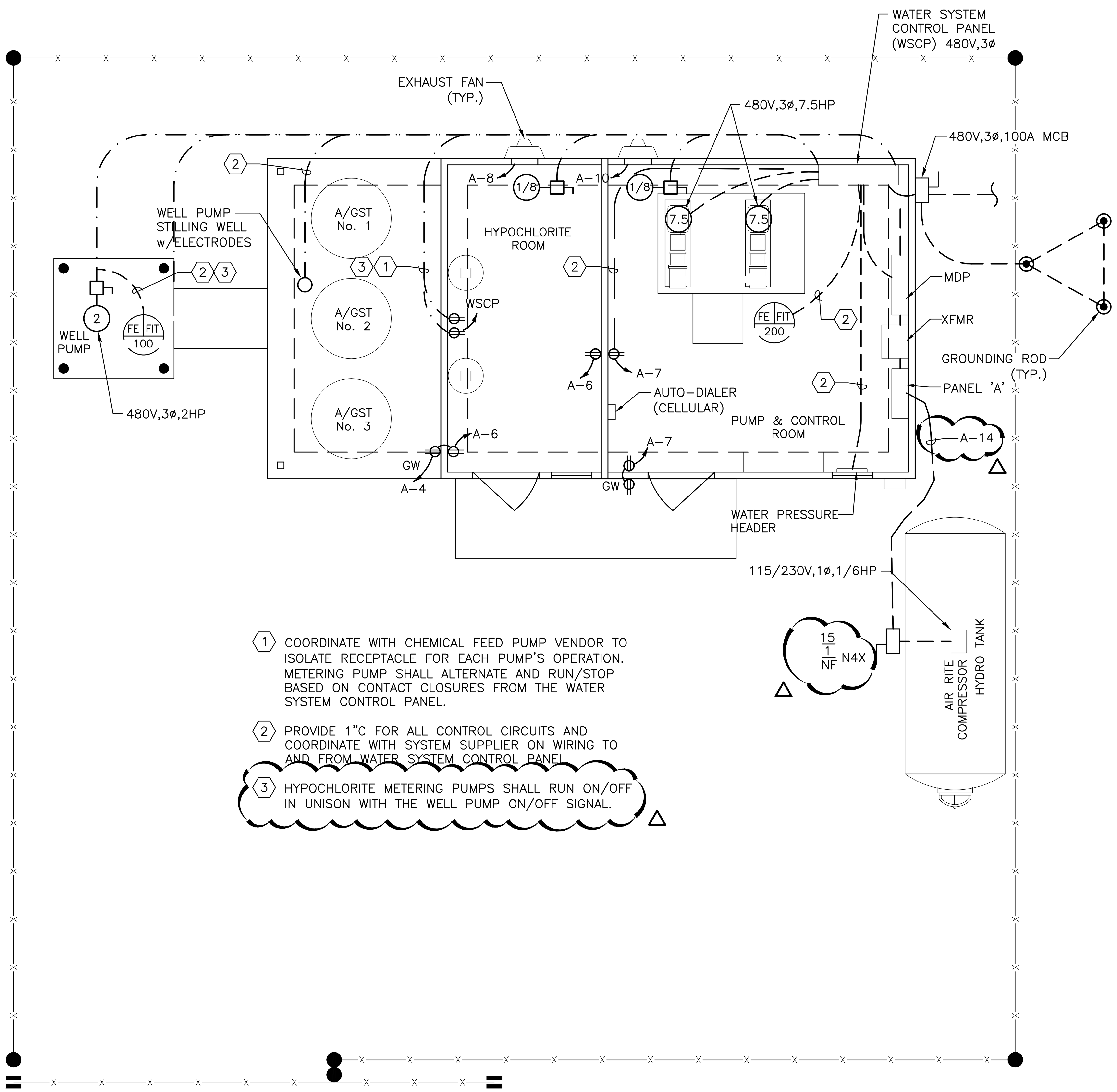
DESIGN DOCUMENTS

ISSUE	DATE
BID	01/06/23
△ ADDN	02/13/23

SHERIFF'S DEPARTMENT TRAINING CENTER COMPLEX
WELL AND WATER TREATMENT PLANT
Nassau County, Florida

ELECTRICAL – SINGLE LINE DIAGRAM

VRL PROJECT NO: XXXX
DRAWN BY: DHS
CHECKED BY: MPT
SHEET NO:
WTP-6.1
SHEET



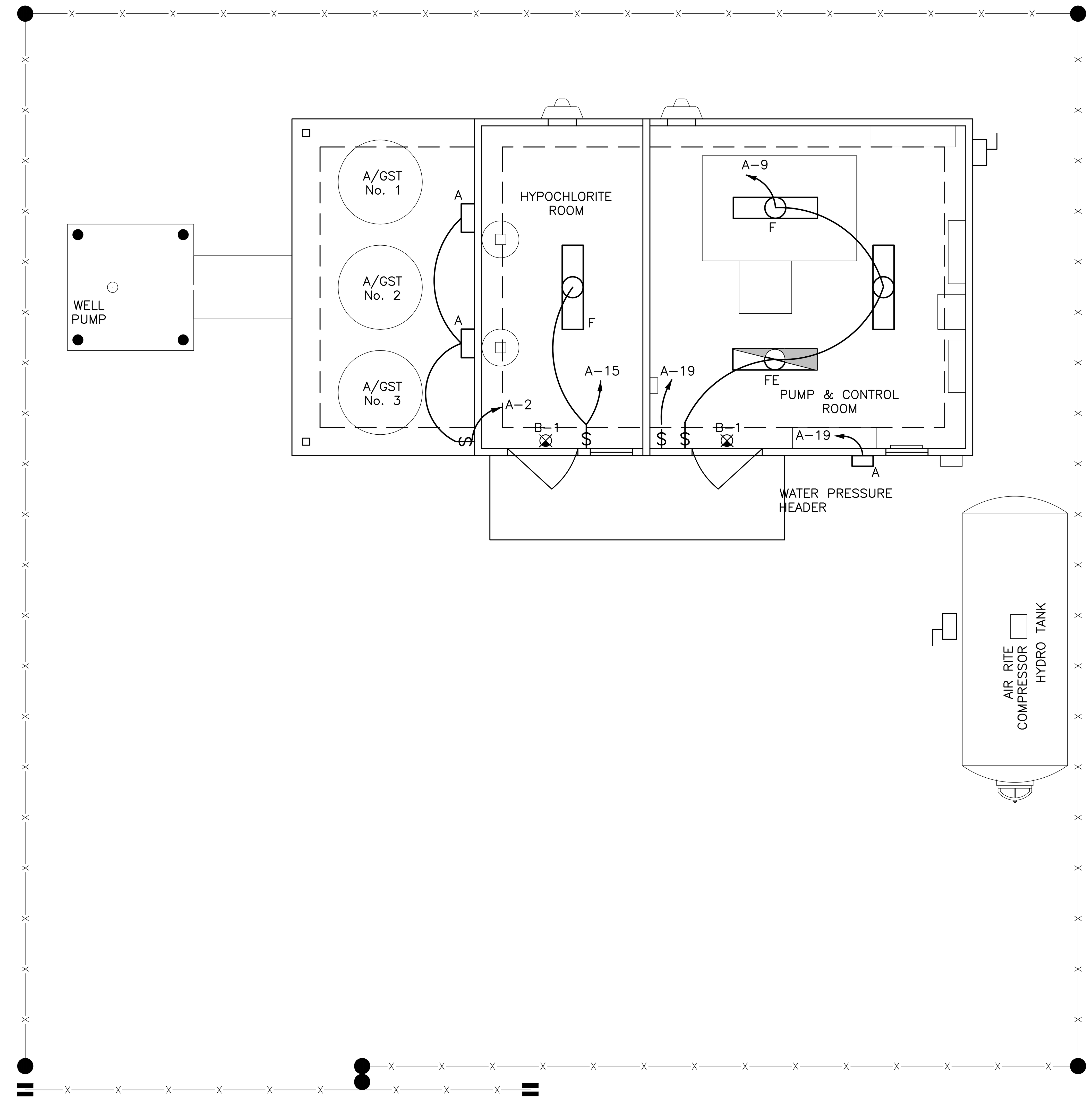
1. COORDINATE WITH CHEMICAL FEED PUMP VENDOR TO ISOLATE RECEPTACLE FOR EACH PUMP'S OPERATION. METERING PUMP SHALL ALTERNATE AND RUN/STOP BASED ON CONTACT CLOSURES FROM THE WATER SYSTEM CONTROL PANEL.
2. PROVIDE 1"C FOR ALL CONTROL CIRCUITS AND COORDINATE WITH SYSTEM SUPPLIER ON WIRING TO AND FROM WATER SYSTEM CONTROL PANEL.
3. HYPOCHLORITE METERING PUMPS SHALL RUN ON/OFF IN UNISON WITH THE WELL PUMP ON/OFF SIGNAL.

POWER PLAN
1/4" = 1'-0"

LIGHTING FIXTURE SCHEDULE

ITEM	MOUNTING	TYPE	VOLTS	MAUFACTURER/CATALOG NO.	REMARKS
A	WALL	LED	120	LITHONIA TWH-LED 20C-50K	WET LABEL, PROVIDE WITH PHOTOCELL
F	CEILING	LED	120	LITHONIA FEM L48 6000LM IMAF MD MVOLT GZ10 40K 80 CRI	WET LABEL
FE	CEILING	LED	120	LITHONIA FEM L48 6000LM IMAF MD MVOLT GZ10 40K 80 CRI	WET LABEL PROVIDE WITH 1100 LUMENS BATTERY PACK
B-1	WALL/CEILING	LED	UNV	LITHONIA LHQM-LED-R-HO RO	EMERGENCY EXIT SIGN (BATTERY)

NOTE: PHOTOCELL NOT REQUIRED FOR COVERED GST AREA.



LIGHTING PLAN
1/4" = 1'-0"

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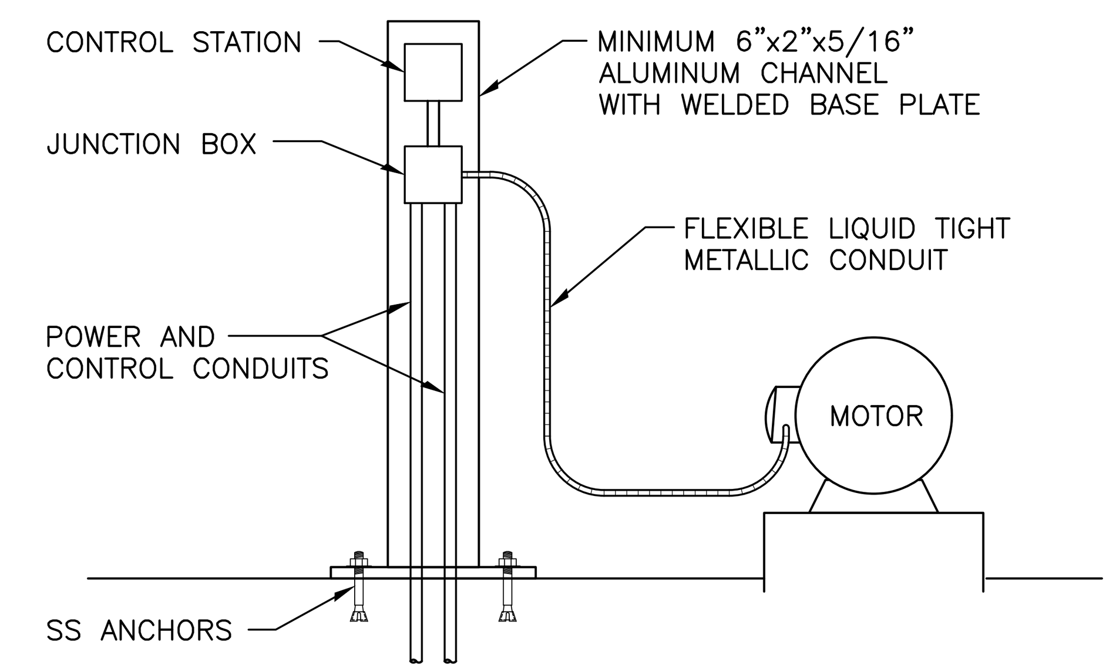
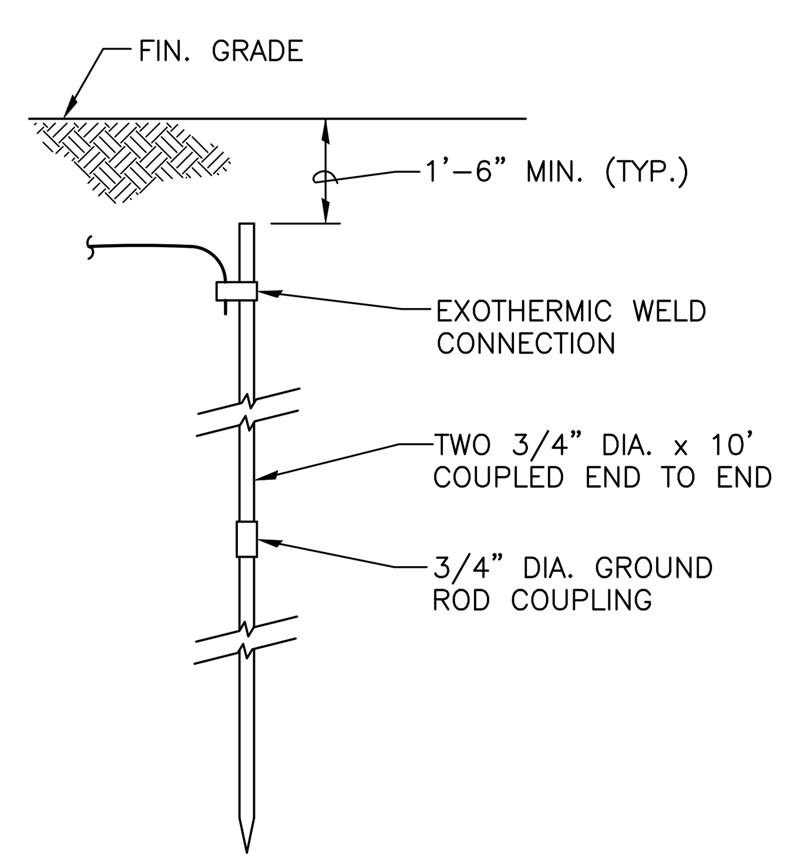
SHERIFF'S DEPARTMENT TRAINING CENTER COMPLEX
WELL AND WATER TREATMENT PLANT
Nassau County, Florida

ELECTRICAL — PLANS

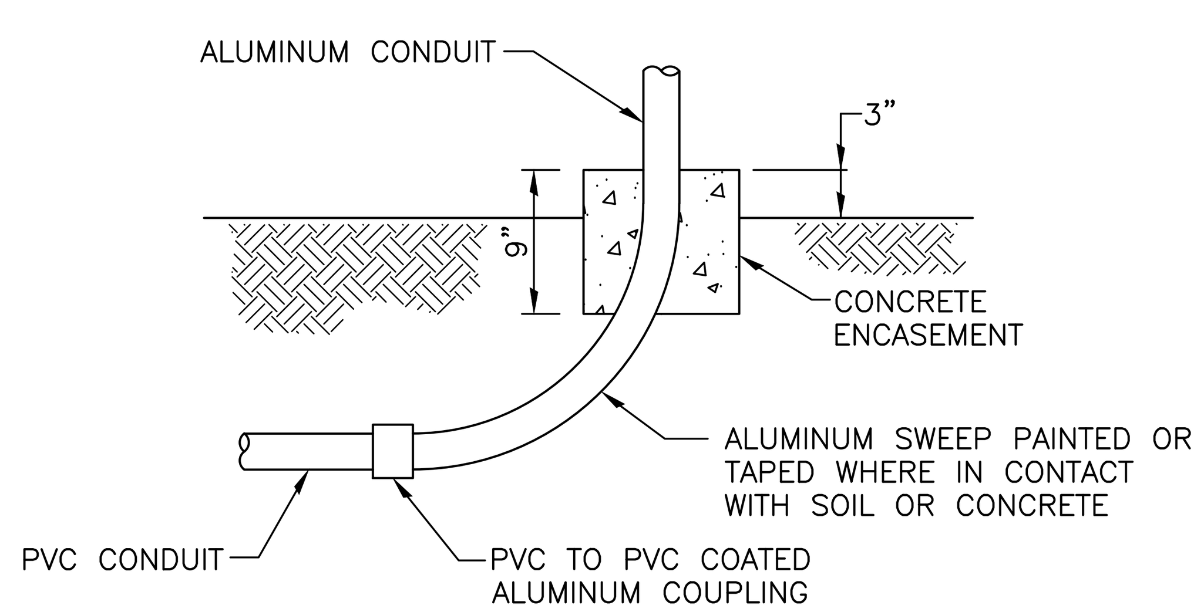
VRL PROJECT NO: XXXX
DRAWN BY: DHS
CHECKED BY: MPT
SHEET NO:
WTP-6.2
SHEET



A X|X TYPICAL MOTOR CONNECTION
NTS



B X|X TYPICAL GROUNDING DETAIL
NTS



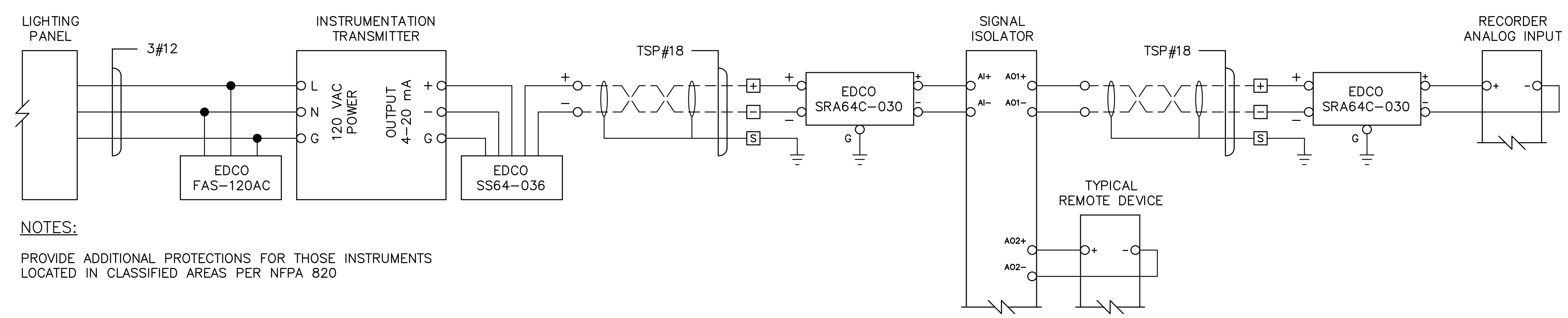
C X|X TYPICAL CONDUIT RISER
NTS

200 AMP MAIN BREAKER
120/208V, 3Ø, 4W

PANEL "A" (SEE NOTE 1) — SURFACE MOUNTED — 10,000 AIC

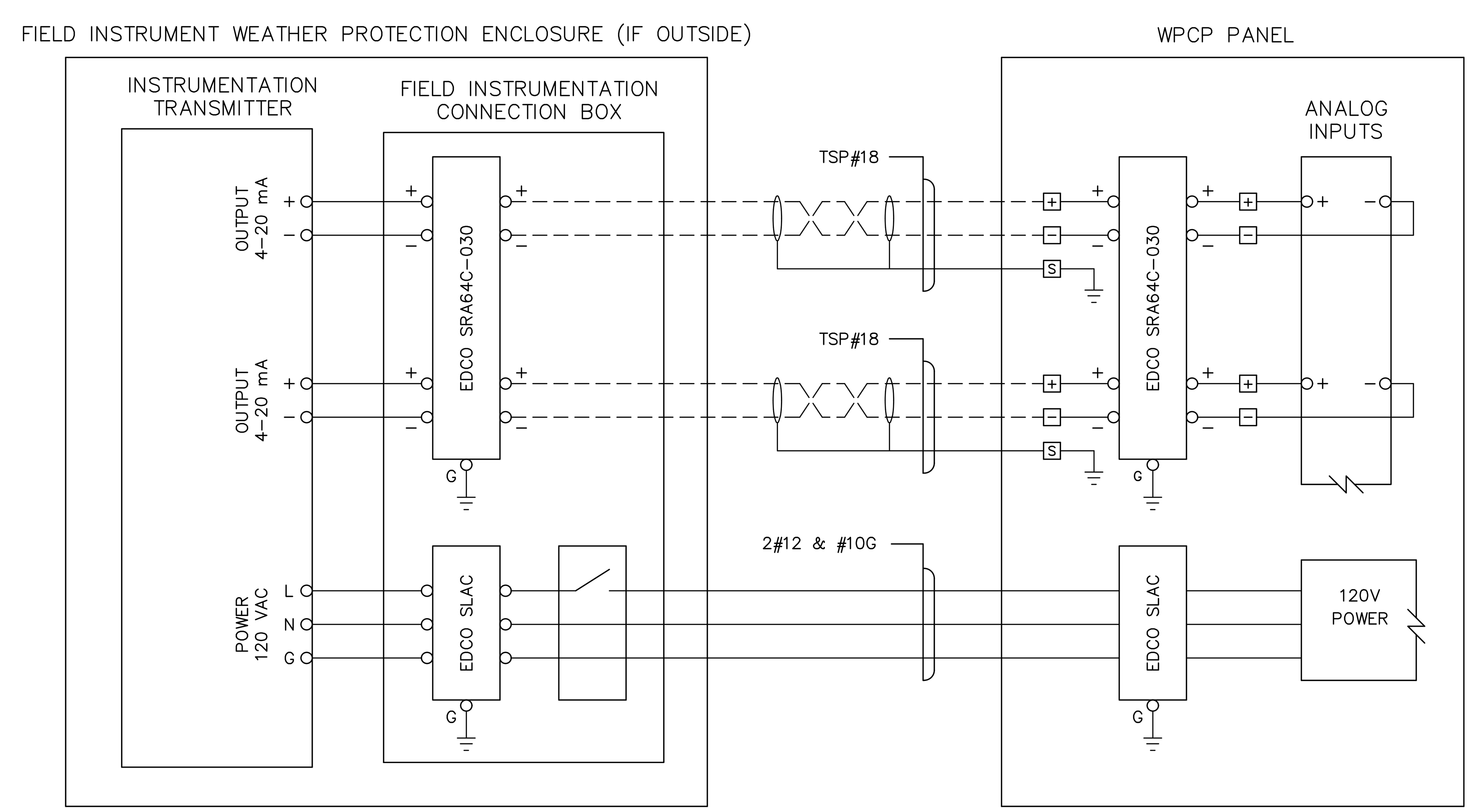
CKT. NO.	TRIP AMPS	NO. POLES	WIRE SIZE	GROUND SIZE	COND. SIZE	EQUIPMENT SERVED	CKT. NO.	TRIP AMPS	NO. POLES	WIRE SIZE	GROUND SIZE	COND. SIZE	EQUIPMENT SERVED
1	60	3	4#6	1#6	1"	SPD	2	20	1	2#12	1#12	3/4"	EXTERIOR LIGHTING
3	\	\	\	\	\	\	4	20	1	2#10	1#10	3/4"	EXTERIOR GFI RECEPTACLE
5	\	\	\	\	\	\	6	20	1	2#12	1#12	3/4"	RECEPTACLE – CHLORINE ROOM
7	20	1	2#12	1#12	3/4"	RECEPTACLES – PUMP & CONTROL ROOM	8	20	1	2#10	1#12	3/4"	EXHAUST FAN No.1
9	20	1	2#12	1#12	3/4"	INTERIOR LIGHTING – PUMP & CONTROL ROOM	10	20	1	2#10	1#12	3/4"	EXHAUST FAN NO. 2
11	20	1	–	–	–	SPARE	12	20	1	2#12	1#12	3/4"	AUTO-DIALER
13						SPACE	14	15	1	2#10	1#10	3/4"	AIR COMPRESSOR △
15	20	1	2#12	1#12	3/4"	INTERIOR LIGHTING – HYPO ROOM	16						SPARE
17	20	1	2#12	1#12	3/4"	RECEPTACLES – PUMP ROOM	18						SPACE
19	20	1	2#12	1#12	3/4"	EXTERIOR LIGHTING	20						SPACE
21	20	1				SPARE	22						SPACE
23	20	1	–	–	–	SPARE	24						SPACE

NOTE:
1. BALANCE LOADING WITH SHOP DRAWING SUBMITTAL.



NOTES:
PROVIDE ADDITIONAL PROTECTIONS FOR THOSE INSTRUMENTS LOCATED IN CLASSIFIED AREAS PER NFPA 820

TYPICAL INSTRUMENT LOOP DIAGRAM
NTS



TYPICAL INSTRUMENTATION LOOP DIAGRAM

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SHERIFF'S DEPARTMENT TRAINING CENTER COMPLEX WELL AND WATER TREATMENT PLANT
Nassau County, Florida

ELECTRICAL – SCHEDULES AND DETAILS

VRL PROJECT NO: XXXX
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CHECKED BY: MPT
SHEET NO:
WTP-6.3
SHEET

SECTION 33 2105

WATER TREATMENT PLANT - SUBMERSIBLE WELL PUMP AND CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION: The Contractor shall furnish all labor, materials, equipment and supervision for the installation of the submersible well pumps and controls as drawn and specified. Materials and equipment shall include, but not be limited to: discharge head, check valve cone, strainer, pump shaft, pump bowl, cable guards, level controllers and electrical controls completely factory assembled, ready for use.

A. The submersible well pumps shall operate by level controllers connected to the aerator/ground storage tanks standpipe which signal the pumps operation.

1.02 QUALITY ASSURANCE Pump manufacturer/supplier shall have been in business for a minimum of 15 years. Manufacturer shall have a major service center within 150 miles of the project site. Pump service representative shall be available at the site within 24 hours after notification by the Owner.

In order to unify responsibility for proper operation and service of the pumping units, it is the intent of these Specifications that all system components shall be furnished by a single supplier (unitary source).

1.03 SUBMITTALS

A. Shop Drawings: Submit shop drawings and product data for equipment furnished under this section in accordance with the General Conditions.

B. Control Panel Shop Drawings (See Section 26 0900).

1. ~~1-line electrical diagram, computer or draftsman generated, of the power and control system.~~
2. ~~Complete electrical schematics detailing every wire and connection within the system as well as all field connections.~~
3. ~~Bill of material and product data sheets on all high voltage components (>120VAC), drives, switches, and other critical or important components.~~
4. ~~Detailed drawings of the enclosure (size, construction, entry/exit, mounting).~~
5. ~~Exploded detail of every face plate, light, switch or meter mounted on the exterior of the enclosure.~~

C. Operating and Maintenance Manual: Furnish Operation and Maintenance Manuals in accordance with Submittals Section.

D. Equipment Installation Certificate: The Manufacturer shall provide a written report, through the Contractor and endorsed in writing by the Contractor, certifying that the equipment has been properly installed, checked and is ready for placement into routine permanent service.

1.04 GUARANTEE Submit written agreement from manufacturer/in-staller providing unconditional extended warranty on the pumps and motors. The manufacturer's warranty period shall be for one (1) year after the final acceptance of the equipment by the Owner. The equipment manufacturer shall guarantee that the equipment furnished is suitable for purpose intended and free from defects of design, material and workmanship. In the event the equipment fails to perform as specified, the manufacturer shall promptly repair or replace the defective equipment without any cost to the Owner (including handling and shipment costs).

1.05 PRODUCT DELIVERY The equipment shall be factory assembled components delivered undamaged to the site. They shall be capable of being set in place and field connected with minimal field assembly.

1.06 MANUFACTURER'S START-UP SERVICES Furnish services of manufacturer's technical representative to inspect the completed installation, correct or supervise correction of any defects or malfunctions, and instruct operating personnel in proper operating and maintenance procedures as described in Part 3 of this Section.

PART 2 - PRODUCTS

2.01 SUBMERSIBLE WELL PUMP

A. The well pump shall be of the stainless steel submersible turbine type. Acceptable pump: SIMFLO S Series Model 70 HLS, or equal.

B. Pump shall deliver 75 gpm at 72 feet of head and shall be capable of satisfactory operation within the range of 45 to 95 gpm. Minimum shutoff head shall be 98 feet. Pump efficiency shall be such that no more than 2.0 BHP is required at any point on the pump performance curve.

C. The pump shall have a 2-inch NPT discharge port, and all components shall be of stainless steel construction.

D. Motor shall comply with AWWA E102-06. Pump power cable shall be furnished in a length to extend to the junction box, shall be protected by stainless steel cable guards, and shall be UL listed, 600V, copper, complying with AWWA E102-96.

2.02 LEVEL CONTROLLERS (See ~~also~~ Section 26 0900) Level controllers shall be included in the standpipe connected to the aerator/ground storage tanks to control the pumps operation based on water level in the tanks.

~~A. Level controllers shall utilize suspended electrodes, electrode holders, and induction relays. Electrodes, electrode holders, suspension wire, and induction relays shall be manufactured by B/W Controls, Warrick Controls, or equal. Products manufactured by B/W Controls are used to describe the required functions of each level control system below.~~

~~B. Wire suspension electrodes shall utilize a stainless steel electrode that is assembled inside a molded plastic shield that is approximately 2 inches long and 9/16-inch in diameter. Electrodes shall be B/W Controls Catalog No. 6013-W6 with No. 6013-SW suspension wire.~~

~~C. Electrode holders shall be watertight and suitable for exterior locations. Electrode holders shall be cast iron and shall be flanged for attachment to the tank or structure nozzle. The electrode holders shall be sized to accommodate the number of electrodes and shall have a removable inner plate with a grommet for each electrode that provides a vapor tight fit. Electrode holders shall be B/W Controls Catalog No. 6012-E554.~~

~~D. Induction relays shall utilize a 120 VAC power supply and shall have a secondary coil voltage of 220 VAC. Induction relays shall have contact arrangements described below.~~

~~E. Aerator/Ground Storage Tank Level Controller: Controller shall be located in the Plant Control Panel. Electrodes and induction relays shall be selected and arranged to provide the following functional requirements:~~

~~1. Lockout/Reset of High Service Pumps~~
~~One electrode, reset: Standpipe Water Level: 1 ft (51.3 NGVD)~~
~~One electrode, lockout: Standpipe Water Level: 0.5 ft (50.8 NGVD)~~
~~One 1500-F relay~~

~~2. Run/Stop Well Pump~~
~~Two Electrodes~~
~~One, stop: Standpipe Water Level: 5.25 ft (55.6 NGVD)~~
~~One, run: Standpipe Water Level: 2.60 ft (52.9 NGVD)~~
~~One 1500-D relay~~

~~3. Grounding Electrode~~
~~One electrode~~

2.03 CONTROL PANEL See section 26 0900.

2.04 AERATOR/GROUND STORAGE TANK

A. There shall be three 525-gallon aerator/ground storage tanks provided of fiberglass material, plumbed as specified on the Drawings. The tanks shall be Model AG5000 as manufactured by Allied Molded Products, Inc., or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install all pumps, drive units and accessories in accordance with plans, final shop drawings and manufacturer's data.

B. All work shall be performed and all materials shall be in accordance with the National Electrical Code and applicable local regulations and ordinances. The Contractor shall, at his own expense, arrange for and obtain all necessary permits, inspections, and approval by the proper authorities in local jurisdiction of such work.

C. Electrical work shall be done to conform with the construction schedule and progress of other trades. Electrical apparatus on all equipment shall be handled, set in place, connected, checked out, serviced and placed in readiness for proper operation to the satisfaction of the Owner and Engineer, all within the scope of work intended under this Section.

D. Pump pedestals shall be suitably sized for pump baseplates supplied. Contractor shall construct pump pedestals of the dimensions recommended by the pump manufacturer and as approved by the Engineer. Securement of baseplate to pump pedestal shall also be as recommended by pump manufacturer and as approved by the Engineer.

E. All pump suction and discharge piping, valves and fittings shall be suitably supported and secured in order to eliminate strain on the pump. Piping fittings shall be brought properly together before flange bolts are tightened. Any expansion joints installed must be properly anchored and supported. Obtain recommendation from the pump manufacturer and the expansion joint manufacturer prior to finalizing piping design. Final piping design shall be approved by the Engineer.

3.02 INSPECTION AND TESTING

A. Upon completion of installation, the Contractor, in the presence of the Engineer and a qualified manufacturer's representative, shall test the system to insure the proper operation to the satisfaction of the Engineer.

B. Operating personnel shall be trained in operation and maintenance of equipment at start-up. Instruction shall be given in operation, service, adjustments and routine maintenance. Recommended spare lists and maintenance schedules shall be provided.

3.03 DISINFECTION The well shall be disinfected in accordance with AWWA A100-92. Bacteriological samples shall be taken and acceptable results obtained, in accordance with Florida Department of Environmental Protection requirements. Normally, twenty consecutive satisfactory samples are required after the well is disinfected and flushed. All chlorinated water used for disinfection shall be dechlorinated prior to discharging the storm sewer system, open ditch or over land. All testing shall be paid for by the Contractor.

END OF SECTION