

ABRIDGED SPECIFICATIONS FOR SEWER LIFT STATION CONTROL PANEL

PROVIDED BY CITY OF ROCKWALL

3/1/10

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CITY OF ROCKWALL, TEXAS
SPECIFICATIONS FOR LIFT STATION CONTROL PANEL

General:
The control system shall be designed to operate the required number of pumps specified on the drawing at the power characteristics shown on the plans.
The control function shall provide for the operation of the pumps in Hand (manual) and Auto (controlled by PLC). See "24VAC Regulator System" for further information.
The control shall function as described below. The equipment listed below is a guide and does not relieve the supplier from providing a system that will function as required.

Enclosure:
The enclosure shall be a NEMA 4x rated stainless steel. The enclosure shall be a wall mount type with a minimum depth of 8" sized to adequately house all the components.
The door gasket shall be rubber composition with a retainer to assure a positive weatherproof seal. The door shall operate with a single action handle that accepts a 3/8" shaft padlock and opens a minimum of 180 degrees.

Inner Dead Front Door:
A polished aluminum dead front shall be mounted on a continuous aircraft type hinge, contain cutouts for mounted equipment, and provide protection of personnel from live internal wiring. Cutouts for breaker handles shall be provided to allow operation of breakers without entering the compartment. No door mounted operating mechanisms purpose GFI duplex receptacle and other operational devices shall be mounted on the external surface of the dead front. The dead front shall open a minimum of 150 degrees to allow access to equipment for maintenance. A 1/2" break shall be formed around the perimeter of the dead front to provide rigidity.

Back Plate:
The back plate shall be manufactured of 12-gauge sheet steel and be finished with a primer coat and two (2) coats of baked white enamel. All devices shall be permanently identified.

Power Distribution:
The panel power distribution shall include all necessary components and be wired with stranded copper conductors rated at a minimum of 90 degrees C. System shall be equipped with a Stand Alone Manual Fused Double Throw Safety Switch to allow hard wiring to portable generator to prevent dual operation. No door mounted operating mechanisms allowed for breaker operation in control panel. All conductor terminations shall be as recommended by the device manufacturer.

Circuit Breakers:
All circuit breakers shall be heavy-duty thermal magnetic or motor circuit protectors similar and equal to Square D type FAL. Each motor breaker shall be adequately sized to meet the pump motor operating characteristics and shall have a minimum of 10,000 amps interrupting capacity for 250 VAC and 14,000 amps at 480 VAC. The control circuit and the duplex receptacles shall be individually controlled by heavy-duty breakers.

PLC:
The PLC shall be a Schneider Electric TSX Momentum PLC consisting of at least three part numbers:
1) Processor adapter with one RS232 and one I/O Bus port: 171 OCC 760 10
2) Output adapter with one RS232/RS485 port: 172 JNN 210 32
3) 24V DC Base with 16 inputs and 16 outputs: 170 ADM 350 10
Programming shall be programmed by others using Schneider Electric ProWORX32 PLC programming software. The switches shall sense the "OFF", "LEAD", "LAG", "ALARM" levels. As the level in the wet well rises the lead pump, as determined by the alternator, shall start and pump the station to the "OFF" position. In the event the incoming flow exceeds the capacity of the lead pump, the lag pump shall start and both pumps shall run to the off level. The alternator shall switch when the off level is reached. If the level continues to rise, alarm functions shall be activated. All inputs and outputs shall be wired to a terminal strip at bottom of cabinet.

RADIO EQUIPMENT:
SCADA: Equipment for SCADA shall be Kimax part # TR-Y159-C50-P-ICC. Contact number for Kimax is [redacted]. Contact them for pricing and equipment dimensions and power requirements in the panel and on rack.

Auxiliary Equipment:
HOA Switches: A three position HOA switch shall be provided on the inner dead front for each pump.
Run Indicators: A run pilot indicator shall be provided on the inner dead front. All indicator lights shall be push to test.
Elapsed Time: This function shall be provided by the PLC.
Cabinet Temperature Control: The cabinet shall be equipped with a panel heater controlled by a thermostat and a vent fan controlled by a thermostat.
Receptacles: One duplex receptacle located on inner dead front door for general purpose use. This receptacle shall be of the ground fault type, 120volt, and protected by a 20 amp breaker. A second single receptacle shall be located on the back panel to provide power for UPS back up system. This receptacle shall be 120 volt and protected by a separate 20 amp breaker.

UPS Back Up System: Will provided 120 Volt power to SCADA communication equipment and all low voltage power transformers. This must be installed in the control panel. UPS shall be APC 650VA 120 Volt or equivalent.

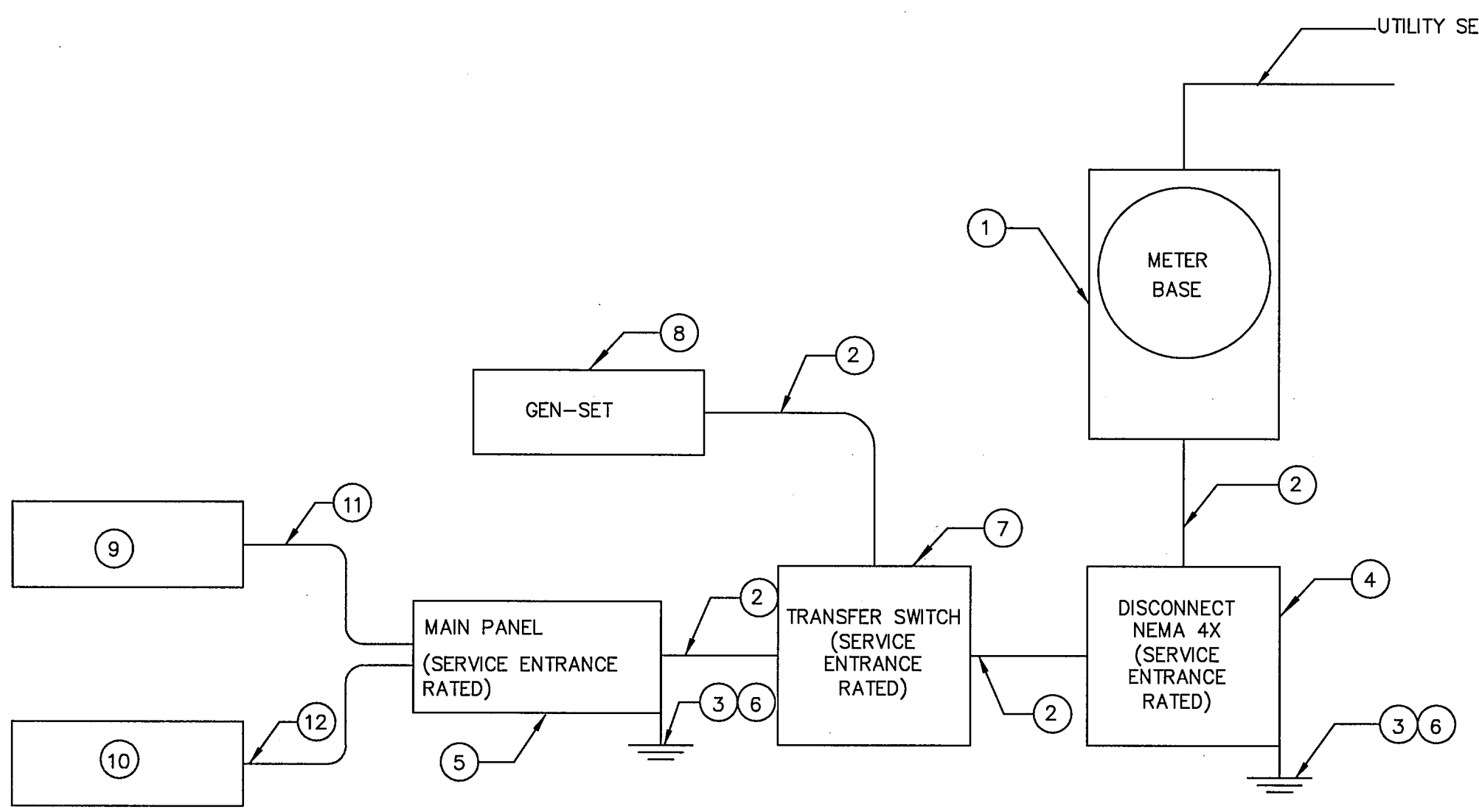
The System must be able to transmit all alarms and wet well levels when on backup power.

Motor Protection: A control and status module shall sense either motor over temperature or seal leakage, and shall turn off the pump, lock out the pump, and send an alarm.

Miscellaneous:

NOTES BY SYMBOL

- 1 3-PHASE, NEW UTILITY METER
- 2 CONDUCTORS, FROM METER TO DISCONNECT IN CONDUIT.
- 3 PROVIDE 10 FT GROUND ROD AND GROUND WIRE.
- 4 SERVICE ENTRANCE RATED NEMA 4R DISCONNECT (3-PHASE).
- 5 SERVICE ENTRANCE RATED MAIN PANEL, COPPER BUSSING, 3-PHASE, WITH MINIMUM OF 2-3POLE UNUSED SPACES IN PANEL AT COMPLETION OF CONSTRUCTION.
- 6 PROVIDE BONDING FROM METER TO MAIN PANEL.
- 7 SERVICE ENTRANCE RATED AUTOMATIC TRANSFER SWITCH, NEMA 4X SS, 3-PHASE.
- 8 EMERGENCY GENERATOR.
- 9 LIFT STATION PUMP CONTROL PANEL.
- 10 MINI POWER ZONE (15KW) IF SERVICE IS 480
- 11 CONDUCTORS TO LIFT STATION PUMP CONTROL PANEL IN CONDUIT.
- 12 CONDUCTORS TO MINI POWER ZONE (IF REQUIRED) IN CONDUIT.



1 ELECTRICAL ONE-LINE DIAGRAM
NO SCALE

NOTE: COORDINATE EXACT LOCATION OF SERVICE ENTRANCE WITH UTILITY COMPANY, AND OWNER.

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH NFPA 820 REGARDING HAZARDOUS CLASSIFICATION, GROUP AND DIVISION.
2. ALL ABOVE GRADE CONDUIT SHALL BE RIGID ALUMINUM OR PVC COATED ALUMINUM AS APPLICABLE.
3. ALL EXPOSED ENCLOSURES SHALL BE NEMA 4X 316 SS WITH QUICK-RELEASE LUGGAGE LATCHES.
4. CONTRACTOR IS RESPONSIBLE FOR NEC REQUIREMENT CLEARANCE AROUND AND ABOVE OF ALL ELECTRICAL EQUIP. (NEC 110.26)
5. NON-METALLIC ENCLOSURES SHALL ONLY BE USED ON INDOOR LOCATIONS.
6. ALL CIRCUIT HOME-RUNS SHALL BE MINIMUM 2-#12, #12G, 3/4" C. VOLTAGE DROP SHALL COMPLY WITH NEC.
7. FLEXIBLE CONDUIT MAY BE USED ONLY FOR FINAL CONNECTION TO EQUIPMENT. (MAXIMUM LENGTH 6').
8. ALL PANEL DIRECTORY SHOULD BE TYPED.
9. CONTRACTOR SHALL PROVIDE LAMPS FOR ALL LUMINARIES.
10. MINIMUM 2-#12, 1-#12 GROUND, 3/4" CONDUIT.
11. INSTALLATION OF WORK SHALL COMPLY WITH ALL LOCAL AND STATE CODES AND AUTHORITIES HAVING JURISDICTION.
12. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO INSURE A COMPLETE WORKING SYSTEM.
13. COORDINATE LOCATION OF ALL PANELS WITH OWNER.
14. THESE PLANS ARE SCHEMATIC, VERIFY EQUIPMENT LOCATION AND CONDUIT ROUTING, ETC. PRIOR TO BID.
15. CONTRACTOR SHALL PROVIDE PROPER CONDUIT SEAL AS APPLICABLE FOR TERMINATION.

ELECTRICAL NOTES

1. THE CONTRACTOR SHALL COORDINATE UTILITY SERVICE WITH ELECTRIC COMPANY.
2. THE CONTRACTOR SHALL FURNISH AND PROVIDE EXPLOSION PROOF, 3 PHASE, 60 HZ. EACH 20 HP MOTORS (MAXIMUM).
3. THE CONTRACTOR SHALL PROVIDE METER BASE (AS REQUIRED BY LOCAL UTILITY).
4. THE CONTRACTOR SHALL PROVIDE MAIN DISCONNECT (NEMA 4X SS-304).
5. THE CONTRACTOR SHALL PROVIDE COPPER WIRING WITH GROUND IN RIGID CONDUIT FROM METER TO SERVICE DISCONNECT TO CONTROL PANEL.
6. THE CONTRACTOR SHALL COORDINATE ROUTING IN THE FIELD. ALL ELECTRICAL WORK SHALL CONFORM WITH NEC, NATIONAL, STATE, AND LOCAL CODES.
7. THE CONTRACTOR SHALL VERIFY VOLTAGE PRIOR TO PLACING ORDER FOR PUMP MOTORS.
8. THE CONTRACTOR SHALL FURNISH AND PROVIDE LIGHTNING ARRESTOR.
9. THE CONTRACTOR SHALL FURNISH AND PROVIDE RUN TIME METER AND RUN LIGHT FOR EACH PUMP.
10. THE CONTRACTOR SHALL FURNISH AND PROVIDE SEAL FAIL RELAYS WITH PILOT LIGHT, MAIN CIRCUIT BREAKER, AND EMERGENCY RECEPTACLE.
11. THE CONTRACTOR SHALL FURNISH AND PROVIDE CONTROL PANEL AND MAIN DISCONNECT SHALL BE SIZED ACCORDING TO NEC. 110 V RECEPTACLE INSIDE CONTROL PANEL.
12. THE CONTRACTOR SHALL FURNISH AND PROVIDE TWO EXTRA FUSES OF EVERY SIZE AND TYPE USED, SHALL BE STORED AT THE LOCATION WHERE NEEDED.

ABRIDGED T.C.E.Q. NOTES

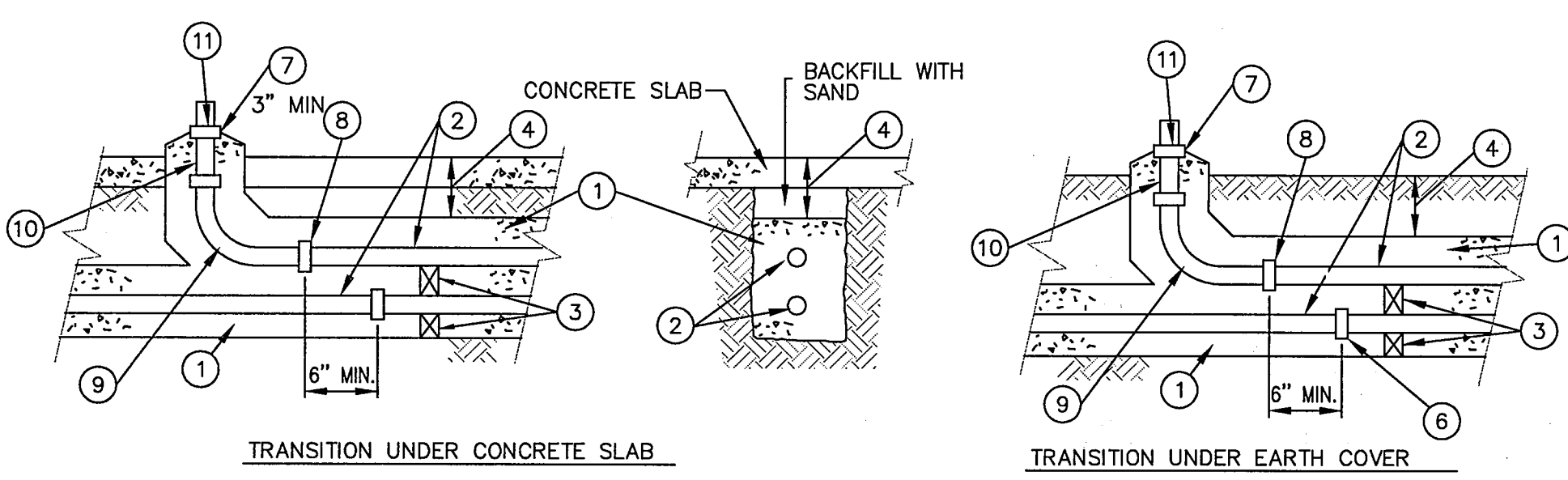
- §217.60. LIFT STATION, WET WELL, AND DRY WELL DESIGNS.
(A) PUMP CONTROLS.
- L13.5;(1) A LIFT STATION PUMP MUST OPERATE AUTOMATICALLY, BASED ON THE WATER LEVEL IN A WET WELL.
(2) THE LOCATION OF A WET WELL LEVEL MECHANISM MUST ENSURE THAT THE MECHANISM IS UNAFFECTED BY CURRENTS, RAGS, GREASE, OR OTHER FLOATING MATERIALS.
(3) A LEVEL MECHANISM MUST BE ACCESSIBLE WITHOUT ENTERING THE WET WELL.
(4) WET WELL CONTROLS WITH A BUBBLER SYSTEM REQUIRE DUAL AIR SUPPLY AND DUAL CONTROLS.
(5) MOTOR CONTROL CENTERS MUST BE MOUNTED AT LEAST 4.0 INCHES ABOVE GRADE TO PREVENT WATER INTRUSION AND CORROSION FROM STANDING WATER IN THE ENCLOSURE.
- L0;(6) ELECTRICAL EQUIPMENT AND ELECTRICAL CONNECTIONS IN A WET WELL OR A DRY WELL MUST MEET NATIONAL FIRE PREVENTION ASSOCIATION 70 NATIONAL ELECTRIC CODE EXPLOSION PREVENTION REQUIREMENTS, UNLESS CONTINUOUS VENTILATION IS PROVIDED.

NO AIR BUBBLE, PROVIDE PRESSURE TRANSDUCER WITH FLOAT BACK-UP OPTION

REVISED PHONE #
817-416-8881
SCOTT BEREMAN

NOTES:

1. CLASS "C" CONCRETE.
2. SEE DESIGN DRAWINGS FOR NUMBER AND SIZE OF CONDUITS. ALL UNDERGROUND CONDUITS SHALL BE PVC SCHEDULE 40 UNLESS OTHERWISE INDICATED ON THE PLANS.
3. SPACERS SHALL BE JOHNS MANVILLE PLASTIC SPACERS OR EQUIVALENT. SPACED 5'-0" O.C.
4. COVER SHALL BE 2'-0" MINIMUM BELOW SOIL SURFACE AND 1'-0" MINIMUM BELOW CONCRETE SLABS, OR AS SHOWN ON PLANS.
5. UNDERGROUND CONDUIT SHALL BE ENCASED IN AN ENVELOPE OF CONCRETE.
6. COUPLING.
7. PROTECT EXPOSED CONDUIT ENDS DURING CONSTRUCTION WITH PIPE PLUG OR CAPS. FUTURE AND SPARE CONDUIT ENDS SHALL HAVE PIPE PLUGS OR CAPS.
8. ADAPTOR FROM NON-METALLIC CONDUIT AS REQUIRED.
9. PVC COATED RIGID S.S. CONDUIT BENDS FOR PVC CONDUITS 2 INCH AND LARGER.
10. RIGID ALUMINUM CONDUIT SIZE AND TYPE AS REQUIRED. EXTEND THIS CONDUIT A MINIMUM OF 6" INTO CONCRETE.
11. CONDUIT TERMINATING IN AN ENCLOSURE CONTAINING A GROUND BUS SHALL HAVE A GROUNDING BUSHING WITH A GROUND WIRE TO THE GROUND BUS.



2 UNDERGROUND CONDUIT INSTALLATION DETAIL
NO SCALE

BAR IS ONE INCH IN LENGTH ON ORIGINAL DRAWING. CHECK SCALE AND ADJUST ACCORDINGLY.
ONE INCH

NOTE: REFER TO TECHNICAL PREVISIONS IN CONTRACTS DOCUMENTS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

Circuit breakers shall be indicating type, providing "ON-OFF-TRIP" positions of the operating handle. When the breaker is tripped automatically, the handle shall assume a middle position indicating "TRIP".
Thermal magnetic breakers shall be quick-make and quick-break on both manual and automatic operation and have inverse time characteristics secured through the use of bimetallic tripping elements supplemented by a magnetic trip.
Breakers shall be designed so that an overload on one pole automatically trips and opens all legs. Field installed handled ties shall not be acceptable.
Motor Starters:
Motor starters shall be open frame, across the line; NEMA rated with individual overload protection in each leg. Motor starter contact and coil shall be replaceable from the front of the starter without being removed from its mounted position. Overload heaters shall be solid state motor logic type with the following features: 3 to 1 adjustment for trip current, phase loss and unbalance protection, LED power indication, ambient insensitive and self-powered, and shall have availability of electrical remote reset. Overloads shall be sized for the full load amperage draw of the pumps. Definite purpose contactors, fractional size starters and horsepower rated contactors or relays shall not be acceptable.
Transformers:
Control transformers shall provide the 120 VAC and/or 24 VAC for control circuits. Transformers shall be fused on the primary and secondary circuits. The secondary shall be grounded.
Lightning-Transient Protection:
A lightning-transient protector with tell-tale warning lights on each phase to indicate loss of protection on the individual phases shall be provided. The device shall be solid state with a response time of less than 5 nanoseconds withstanding surge capacity of 6500 amperes. Unit shall be instant recovery, long life and have no holdover currents.
Phase Monitor:
A line voltage rated, adjustable phase monitor shall be installed to sense low voltage, loss of power, reversed phasing and loss of a phase. Control circuit shall de-energize upon sensing any of the faults, and shall automatically restore service upon return to normal power.
Alarm System:
The alarm light shall be a weatherproof, shatterproof, red light fixture with a 40 watt bulb to indicate alarm conditions. The alarm light shall be turned on by the alarm level.
The alarm light shall be mounted on the exterior of the cabinet. The alarm horn shall provide an audio signal of not less than 90 db at 10 feet. An alarm silence switch shall be mounted on the exterior of the cabinet and deactivate the alarm horn; however, the alarm light shall flash until the alarm condition ceases to exist.
24 VAC Regulator System:
The control system shall provide for both automatic and manual control and alternation of the pumps to maintain a pumped down condition of the wet well. The system shall

Panel Racks:
Posts supporting racks shall be 3" minimum rigid conduit capped and bolted directly to channel framework supporting the panels.

Panel shall have a structure using 1/4" minimum aluminum plate to provide a solid back plate behind panels and overhead protection from rain. Provide lighting mounted on structure with switch mounted on exterior of panel to light up panel area.
Contact City of Rockwall at 972-771-7730 for location of existing type structure.

Each pump must have its own conduit for power cord and a separate conduit for all float wires.
Wet Wells:
Wet well shall have metal safety grates.
All hatch's shall have accommodations for locking above grade with 3/8" shaft padlocks provided by the City.
Check Valves shall be of the spring type.
Level control system shall use floats for pump operation.

Drawings: Control panel schematic drawings shall be submitted for approval with the submittal plans.
Final control panel wire schematic drawings including a list of all legends (2 sets total) shall be provided. One set shall be encapsulated in Mylar and attached to the inside of the front door of the control cabinet. A second set shall be delivered to the City of Rockwall Wastewater Department.

Panel Markings: All component parts in the control panel shall be permanently marked and identified as they are indicated on the drawing. Marking shall be on the back plate adjacent to the component. All control conductors shall be identified with wire markers as close as practical to each end of conductors.

Panel Wiring: All wiring in panel shall maintain a minimum of 1/16" spacing between components and wire ways.

Testing: All panels shall be tested to the power requirements as shown on the plans to assure proper operation of all the components. Each control function shall be activated to check for proper operation and indication.

Guarantee: All equipment shall be guaranteed for a period of three (3) years from date of acceptance. The guarantee is effective against all defects in workmanship and/or defective components. The warranty is limited to replacement or repair of the defective equipment.

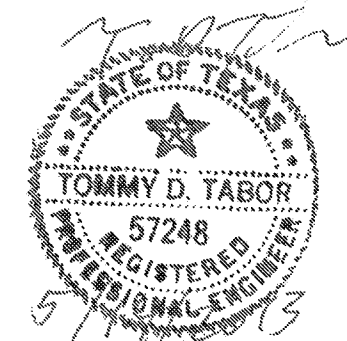
Manufacturer: The manufacturer shall be a UL listed shop for industrial control systems and shall provide evidence of such on request from the engineer or using authority.

PERKINS ENGINEERING CONSULTANTS, INC.
T. TABOR CONSULTING, PLLC (5279)
1301 DEBBIE LANE, SUITE 102-152
MANSFIELD, TEXAS 76063
972-896-6969

DEVELOPMENT PLANS FOR
BREEZY HILL PHASE I
ROCKWALL, TEXAS

GENERAL NOTES & SERVICE ENTRANCE ONE-LINE

DRAWN BY MLH / KF	DESIGNED BY TDT	CHECKED BY TDT	SHEET NO. LSE - 3
JOB NUMBER COR 12-001	DATE MAY 2013	SCALE NOTED	



AS-BUILT APRIL 2014
INFORMATION PROVIDED BY CONTRACTORS
(NOT FIELD VERIFIED)

Y:\ACTIVE\PROJECTS\ACTIVE-DATA\CURRENT-PROJECTS\Perkins-Rockwall-LS-Breezy-Hill-2012\CAD\BreezyHill-Lit-Station.dwg May 15, 2013 10:14am User: TommyT