

1.0 General:

- 1.1 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.
- 1.2 The control function shall provide for the operation of the pumps under normal conditions and shall alternate the pumps on each pump down cycle to equalize the run time. In the event the incoming flow exceeds the pumping capacity of the lead pump, subsequent pumps shall automatically start to handle the increased flow. As the flow decreases, the pumps shall cut off at the elevations as shown on the plans.
- 1.3 Each pump shall be protected by thermal switches embedded in the motor windings. In the event of an overtemperature condition, the pumps shall shut down and remain inactive until the motor housing cools off.
- 1.4 The control shall function as described below. The equipment listed below is a guide and does not relieve the supplier from supplying a system that will function as required.

2.0 Mechanical:

- 2.1 The enclosure shall be a NEMA rated enclosure of the material noted on the drawings. 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 open a minimum of 180 degrees.
- 2.2 A polished aluminum dead front shall be mounted on a continuous aircraft type hinge and shall 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. All control switches, indicator pilot lights, elapsed time meters, 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 3/4" break shall be formed around the perimeter of the dead front to provide rigidity.
- 2.3 The back plate shall be manufactured of 12-gauge sheet steel and be finished with a primer coat and two [2] coats of baked on white enamel. All hardware mounted to the subpanel shall be accomplished with machine thread topped holes. Sheet metal screws are not acceptable. All devices shall be permanently identified using engraved nameplates. Use of Dymo type labels is not acceptable.

3.0 Electrical:

- 3.1 The panel power distribution shall include all necessary components and be completely wired with stranded copper conductors rated at 90 degrees c. All conductor terminations shall be as recommended by the device manufacturer.
- 3.2 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 230 VAC and 14,000 amps at 480 VAC. The control circuit and the duplex receptacle shall individually be controlled by heavy-duty breakers.
- 3.2.1 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".
- 3.2.2 Thermal magnetic breakers shall be quick-make and quick-break on manual and automatic operation and have inverse time characteristics secured through the use of bimetallic tripping elements supplemented by a magnetic trip.
- 3.2.3 Breakers shall be designed so that an overload on one pole automatically trips and opens all legs. Field installed handle ties shall not be acceptable.
- 3.3 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 removing from its mounted position. Overload heaters shall be block type, utilizing melting alloy spindles, and shall have visual trip indication. Overload 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.
- 3.4 Control transformers shall be provided to 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.
- 3.5 A lightning-transient protector with telltale 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 with withstanding surge capacity of 6500 amperes. Unit shall be instant recovery, long life and have no holdover currents.
- 3.6 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.
- 3.7 The Electrical power supply to the lift station shall be sized to accommodate the future 75 HP. pumps.
- 3.8 An external power breaker shall be installed capable of being connected to the portable generators operated by the City of Rockwall. The breaker shall be sized to accommodate the power required to operate the future 75 HP. pumps.

4.0 Alarm System:

- 4.1 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.
- 4.2 The alarm horn shall be mounted on the exterior of the cabinet. The alarm horn shall provide a signal of not less than 90db at 10 feet. An alarm silence switch shall deactivate the alarm horn; however, the alarm light will flash until the alarm condition ceases to exist. At that time the alarm reset function will reset for normal operation.

5.0 CONTROL SYSTEM:

- 5.1 The controller shall provide multiple LED indicators to indicate pump operation, pump faults, alternation sequence and alarm conditions.
- 5.2 The unit shall provide a RS232 and RS422/RS485 communication links for down loading of logged data for telemetry use.
- 5.2.1 All settings, parameters and controls will be fully accessible via the communications port or front keypad.
- 5.2.2 The units shall be capable of being networked on an RS485 twisted pair link so that a multiple number of units can be fully controlled and monitored.
- 5.2.3 The unit shall be capable of interfacing directly with a single two-way radio or modem.
- 5.3 An integrated software package shall be supplied that will provide the system monitoring, pump logic and control, station protection and event logging. The software package shall be a modular suite of self-integrating building blocks that shall incorporate Modbus protocol and be compatible with the plant processing and pump controller requirements. The modular building blocks shall incorporate: [1] real time operator interface, [2] a historical data management and reporting functions, [3] a maintenance management system that compiles equipment information, schedules preventative maintenance, develops work orders, tracks inventory/purchasing and maintains a logbook by individual operators and technicians.

6.0 Ancillary Equipment:

- 6.1 A green run pilot indicator shall be mounted on the dead front door.
- 6.2 An elapsed time meter shall be mounted on the dead front door. The meter shall operate on 120 VAC, shall indicate in hours [6 digits] and tenths and shall be non-resettable.
- 6.3 The contractor shall provide a Soda (radio wave) unit to City of Rockwall requirements.

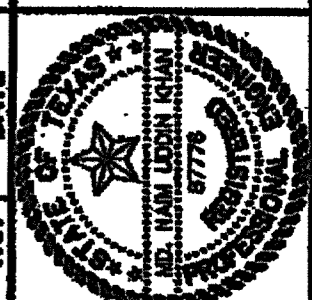
7.0 Miscellaneous:

- 7.1 A final as built drawing encapsulated in mylar shall be attached to the inside of the front door. A list of all legends shall be included.
- 7.2 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 at each end as close as practical to the end of conductor.
- 7.3 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 indication.
- 7.4 All equipment shall be guaranteed for a period of three [3] years from date of shipment. The guarantee is effective against all defects in workmanship and /or defective component. The warranty is limited to replacement or repair of the defective equipment.
- 8.0 Manufacturer:
- 8.1 The manufacturer shall be a UL 508 listed shop for industrial control systems and shall provide evidence of such on request from the engineer or using authority.

FLOATS

- 1.1 The station shall be equipped with a liquid level sensor system, consisting of four floats and all associated cables and hardware.
- 1.2 Per the City of Rockwall, the liquid level system shall be a Modicon 612 PLC for this station.

NO.	DATE	REVISION	APPROV.



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THESE CONSTRUCTION PLANS WERE PREPARED UNDER THE RESPONSIBLE SUPERVISION OF M.D. NAIM UDDIN KHAN, REGISTERED PROFESSIONAL ENGINEER NO. 87776

M. Naimuddin Khan 3/6/06

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THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY M.D. NAIM UDDIN KHAN, # 87776

**THE PRESERVE LIFT STATION  
CONTROL PANEL & FLOAT SPECIFICATIONS**

**APPROVED FOR CONSTRUCTION**  
MAR 20 2006

City of Rockwall Engineering Dept.  
City Engineer:

**REVISION**  
MAY 30 2007  
CITY OF ROCKWALL ENGINEERING DEPT.

Date: 05/21/05  
Scale: 1"=5'  
Designed By: MK  
Drawn By: MK  
Checked By: FEM  
File: 406023LIFT4.Dwg  
Project No.: 4060201

**SHEET**  
**34A**  
**OF**  
**42**