

**SPECIFICATIONS FOR DUPLICATE GRINDER PUMPS**

**A. GENERAL**

Furnish and install a complete pumping system as manufactured by HYDR-O-MATIC Pump, Ashland, Ohio. System shall include two sewage grinder pumps, four 3000 mercury switch level controls, steel sump cover with vent flange, steel pump covers with lifting eye and discharge flange, suspension pipes with pump mounting plates, and discharge pipes with HYDR-O-MATIC ball check valves. All piping external to the station shall be furnished and installed by the contractor. A NEMA III weatherproof control box shall be supplied for mounting at the pump site. Structure and dimensions to be as shown on drawings.

**B. OPERATING CONDITIONS**

Each pump shall have a capacity of 20 GPM at a total head of 25.5'. Pump motor shall be single phase, 230 volts, 3450 rpm, 60 cycle.

**C. PUMPS AND MOTORS**

The grinder pump and motor are to be specially designed and manufactured so they can operate completely submerged in the liquid being pumped. Electrical power cord is to be sealed by use of a cord grip, with individual conductors additionally sealed into the cord cap assembly with epoxy sealing compound. One circulating liquid entering the motor by following individual conductors inside the insulation. The cord grip shall have a male taper pipe thread threaded into a female taper pipe thread in a cord cap. The cord cap shall be sealed into the motor housing with a Buna-N O-ring, providing an electrical connection which is completely weather-tight, yet may be easily removed for service simply by taking out the cap screw.

The combination centrifugal pump impeller and grinder unit shall be attached to a pump motor and pump shaft made of stainless steel. The grinder unit shall be on the suction side of the pump impeller, discharging directly into the impeller inlet bearing no exposed shaft to permit packing of ground solids. The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better removal of particle size. Both stationary and rotating cutters shall be made of hardened and ground stainless steel. The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges for longer service life. Pump and motor housings are to be high quality grey iron castings. Impeller shall be bronze. All fasteners shall be of 18-8 stainless steel.

The pump-motor shaft shall be sealed by two-mechanical carbon and ceramic faced seals inside an oil filled chamber to provide clean, constant lubrication. The shaft shall be supported by an upper ball radial and thrust bearing and a lower bronze-radial sleeve bearing, between the shaft seals to maintain overhang, both running in oil.

The motor winding and rotor are to be mounted in a sealed, submersible type housing which is filled with clean high dielectric oil for bearing lubrication and to transmit heat from motor winding to outer housing.

Motor winding shall be securely held in the housing with machine screws so that it may be removed in the field without the use of heat or a press. The ball bearing is to be supported by an O-ring sealed, movable cap so that grinder and impeller clearance may be adjusted externally for most efficient operation.

**D. SUMP LEVEL CONTROLS**

Sealed float type mercury switches shall be furnished to control sump level and optional alarm signal. The mercury switches shall be sealed in a solid polyethylene float for corrosion and shock resistance. The support wire shall have a heavy neoprene jacket. A weight shall be attached to cord above the float to hold switch in place in sump. Weight shall be above the float to effectively prevent sharp bends in the cord when the float operates. The float switches shall hang in the sump supported only by the cord. Three float switches shall be used to control level. One for pump turn-on, one for pump turn-off, and one for both pump turn-on. A fourth switch shall be provided with alarm. Float switches shall be Model No. 3900.

**E. ALARM LIGHT AND BELL**

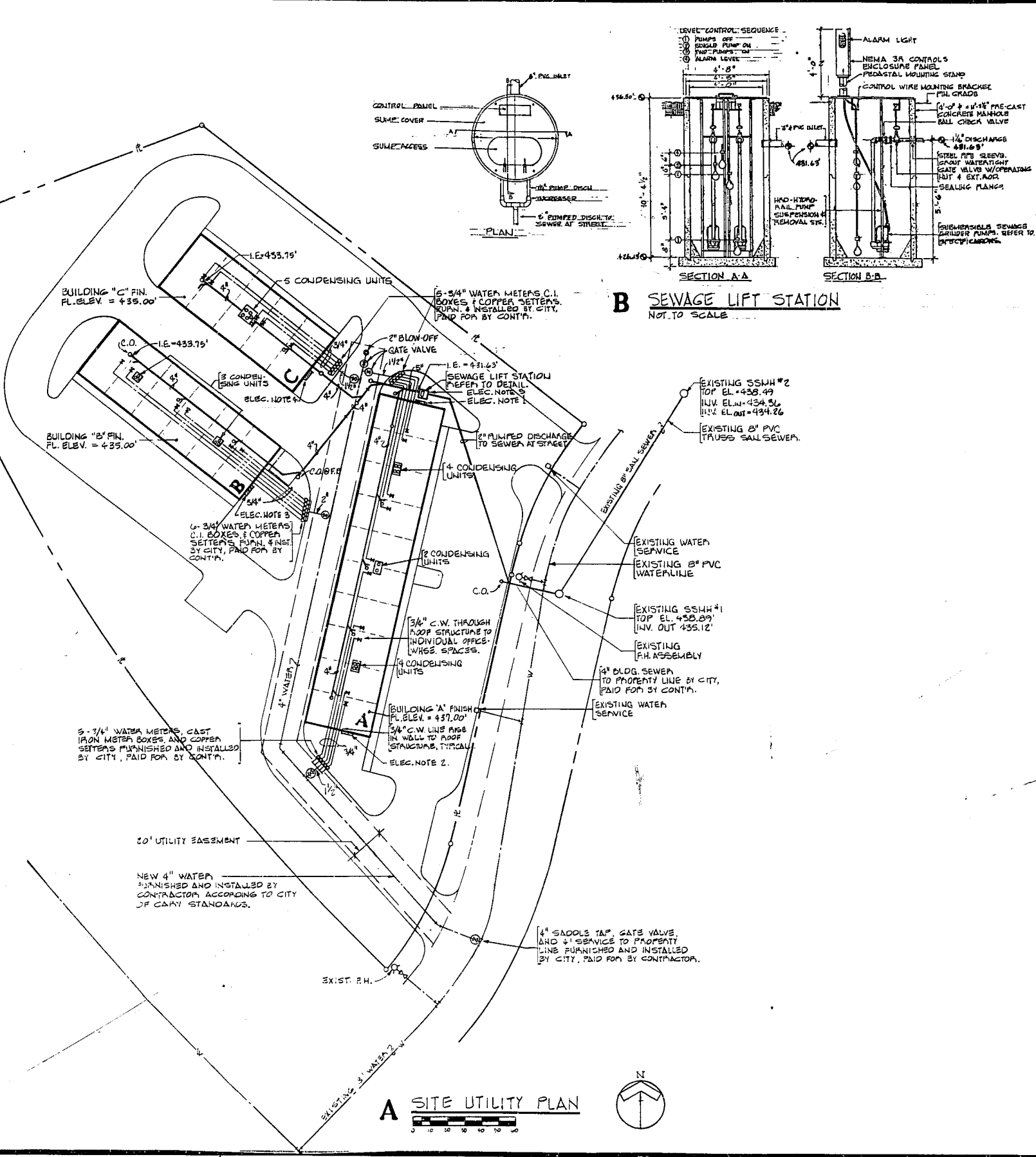
Alarm light and bell to be supplied in separate NEMA III enclosure for mounting at the control box. Alarm bell shall have silencing switch with automatic reset.

**F. OPERATION OF SYSTEM**

On sump level rise lower mercury switch shall first be energized, then upper level switch shall next activate and start lead pump. With lead pump operating, sump level shall lower to low switch turn-off setting and pump shall stop. Alternating relay shall index on stopping of pump so that lag pump will start on next operation. If sump level continues to rise when lead pump is operating, override switch shall energize and start lag pump. Both lead and lag pump shall operate together until low level switch turns off both pumps. If level continues to rise when both pumps are operating, alarm switch shall energize and signal the alarm, where used. If one pump should fail for any reason, the second pump shall operate on the override control and if level rises above override control, alarm shall signal. All level switches shall be adjustable for level setting, from the surface.

**G. ELECTRICAL CONTROL PANEL**

Control panel shall have a NEMA III weatherproof enclosure. A lock hasp shall be provided on door. A circuit breaker shall be provided for each pump and a magnetic starter with 3 leg overload protection for single phase operation, shall be supplied for each pump. An alternating relay shall be provided to alternate pumps on each successive cycle of operation. Starters shall have auxiliary contact to operate both pumps on override condition. The control circuit shall be 115 Volt AC with a separate fused disconnect switch. H-O-A switches and run lights shall be supplied for each pump. Terminal strip shall be provided for connecting pump and control wires. Additional terminals shall be provided to connect alarm.



**KEYNOTED INFORMATION**

**NOTES - ELECTRICAL**

1. Meter center by electrical contractor. Square D # MP45-125R, 480 amp main lugs, 6 meters. Provide with (5) 100 amp, 2-pole circuit breakers to feed half of building A and (1) 60 amp, 2-pole circuit breaker to feed grinder pump electrical control panel.
2. Meter center by electrical contractor. Square D # MP45-125R, 480 amp main lugs, 5 meters. Provide with (5) 100 amp, 2-pole circuit breakers to feed half of building A.
3. Meter center by electrical contractor. Square D # MP46-125R, 480 amp main lugs, 6 meters. Provide with (6) 100 amp, 2-pole circuit breakers to feed building B.
4. Meter center by electrical contractor. Square D # MP45-125R, 480 amp main lugs, 5 meters. Provide with (5) 100 amp, 2-pole circuit breakers to feed building C.
5. Sewage lift station, refer to detail. Provide 2 # 4 & 1 # 18 G in 1" E. from grinder pump electrical control panel to 60 amp, 2-pole breaker at meter center. See note (1).

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