MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**ALTERATIONS TO SEPTIC SYSTEM**

UTL:CJD 1 of 4 APPR:DMG:NJM:02-07-23

**a. Description.** This work consists of alterations to the existing septic system including furnishing and installing a duplex effluent pump system into the existing recirculating tank as shown on the plans, PVC connection pipes, sewage pumps, check valves, discharge assembly, liquid level sensors, electrical panels, casings, seals, circuit breakers and switches, high water alarm and lights, low water alarm and lights, pump cycle timers, electrical relays, cable, conduit, foundation, and all other required materials, electrical devices, and wiring. The work also includes removal and salvage of existing sewerage pumps and control panel, disposal of effluent, cleaning the tank, leak testing and repair, excavation and repair of lagoon berms for installation of sanitary sewer discharge pipe, and all other work as shown on the plans and necessary to complete the item.

**b. Materials.** Ensure all piping for the recirculating tank, except the 3-inch diameter discharge lines, are Schedule 40 PVC with watertight joints and in accordance with *ASTM D2665*. Ensure the 3-inch diameter discharge lines from the pumps are in accordance with the Special Provision for Polyvinyl Chloride Sanitary Force Main.

Pipe. Furnish pipe for the PVC sanitary sewer in accordance with section 825 of the Standard Specifications for Construction.

Sewage Pumps. Furnish two Nationally Recognized Testing Laboratory (NRTL) submersible sewage pumps listed for wastewater application. Ensure the pump motor is capable of pumping approximately 88 gallons per minute (gpm) at 16 feet of head with a minimum shutoff head of 40 feet, and capable of passing a 3/4 inch solid.

Ensure the pumps are run by a timer which has an off cycle of 5 minutes, 7 seconds on and 24 minutes, 53 seconds off. Set the pumps to operate alternately. If one pump fails, ensure the remaining pump is set up to pump exclusively until the other pump is repaired. Furnish pumps equipped with a series of liquid level sensors for on/off, emergency for overriding the pump timer during periods of high usage, and alarm operations.

Furnish each pump with guides and a two-pipe guide rail system. Position the pumps to allow removal without entering the tank. Ensure lifting devices are stainless steel cable. Place the pumps on the existing concrete pump pads in the recirculating tank.

Sewage Pump Controls. Furnish a single phase, 115/230 volt (V) circuit breaker for the pumps with a control "power on" indicating light.

Furnish a hands-off-automatic selector switch and run light for the pumps.

Furnish a liquid level sensor consisting of a mercury switch mounted in a smooth, chemical-resistant, waterproof and shock-proof casing, suspended on its own cable. Ensure the liquid- level sensor circuit is intrinsically safe in accordance with the *NEC, Class I, Division I, Group C and D* and is compatible with the pumps supplied.

As shown on the plans, install a redundant stop level control sensor to stop the pumps in the event of stop level sensor malfunction. Ensure the control sensor also energizes a red indicating light. Equip the pump to start again on rising level while the red light stays energized until the redundant reset button is pressed manually.

Supply a high-water alarm system controlled by a normally closed liquid level sensor. Ensure the alarm circuit is fed from a separate branch circuit and includes a "power on" light, red warning light, and alarm test button. Incorporate the alarm and redundant shut off intrinsically safe relays on the control circuit. Install the warning light to be manually turned off after the pumps have resumed operation.

The high-water alarm level switch must also act as a redundant control sensor, activating the second pump while simultaneously activating the alarm system.

House the control panel in a *NEMA Type 4* enclosure with hinged door and neoprene gasket. Mount all power and control circuit breakers, indicating lights, push buttons, and selector switches in the enclosure. Ensure power and control circuit breakers are not mounted on the door. Install the control panel as shown on the plans and as approved by the Engineer. The color of the control panel must match all other electrical panels on the site. Mount the red indicating light on the control panel and as approved by the Engineer. Install a lightning arrester at the control box.

Furnish a redundant audio/visual alarm and install in the rest area’s janitor’s room as approved by the Engineer.

Physically isolate all intrinsically safe circuit devices and wiring from equipment and wiring operating at line voltage. Identify all control and power devices on a plate mounted adjacent to the device.

Furnish heavy duty type disconnects and circuit breakers rated at 600 V.

Furnish heavy duty industrial type control relays, push buttons, and selector switches.

Miniature type relays are prohibited. Ensure all indicating lights are "push-to-test" type. Ensure all electrical equipment is NRTL approved.

Install a runtime meter for each pump within the control panel. Ensure the runtime meter records the length of time each pump operates, cumulatively adding up the operation time after each successive use.

Ensure all cables within the recirculating tank are intrinsically safe and continuous with no splices or terminal connections unless such splices or connections are contained in a watertight, *NEMA Type 7* enclosure.

Equip the pumps with a line voltage AC magnetic starter with melting alloy-type thermal overload relay to be mounted in the pump control panel.

**c. Construction.** Ensure the Contractor is licensed to conduct work in Kent County and secure all necessary permits to perform this work. Direct questions regarding the construction to the EGLE Water Resources Division:

Leslie N. Sorensen, P.E.

Senior Environmental Engineer

Grand Rapids District Office | Water Resources Division

Michigan Department of Environment, Great Lakes, and Energy

(616) 204-7334

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Complete all work in accordance with applicable federal, state, and local laws, ordinances, and codes.

Ensure the recirculating tank is pumped by a certified sewage hauler licensed by the State of Michigan to remove and properly dispose of all existing sewage.

Fill the recirculating tank with water and monitor for leakage for at least 48 hours before backfilling. Repair leaks with a bituminous plastic sealant approved for use in septic systems as approved by the Engineer. No leakage is allowed.

Remove pumps, floats, guide rails and control wiring from the existing recirculating tank.

Remove the existing control panel, supports and conduit.

Store salvaged pumps and control panel on site as directed by the Engineer. The pumps will remain the property of the Department.

Furnish wiring diagrams for the control panel schematic. Ensure wiring diagrams are approved by the Engineer.

Furnish one print copy and one electronic PDF copy of all operating instructions, repair parts lists, equipment manuals, and automatic control diagrams to the Engineer.

At the request of the Engineer, furnish on-site training for the operation and maintenance of the septic and electrical systems.

Submit shop drawings in PDF for all components associated with the alterations to the existing recirculating tank, sewage pumps and controls. Ensure shop drawings are reviewed and approved prior to beginning work on the alterations to the existing recirculating tank.

Complete the slope restoration in accordance with section 816 of the Standard Specifications for Construction as soon as possible following completion of the backfill but no longer than the time limitations specified in section 208 of the Standard Specifications for Construction. Slope the finished grade as shown on the plans to divert surface water.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

**Pay Item Pay Unit**

Recirculating Tank Alterations Lump Sum

Sewage Pumps and Controls, Rem Lump Sum

Sewage Pump Each

Sewage Pump Controls Lump Sum

Excavation, Earth, Spec Cubic Yard

Embankment, Spec, (CIP) Cubic Yard

1. **Recirculating Tank Alterations** includes dewatering if necessary, pumping and disposal of tank effluent, leak test and repair. Disposal of surplus materials, final cleanup, and other related work and materials required for the completion of the work will not be paid for separately but are included in the pay item **Recirculating Tank Alterations**.

2. **Sewage Pumps and Controls, Rem** includes all work necessary to disconnect and remove existing pumps and electrical control panels.

3. **Sewage Pump** includes all work necessary to install the pump in the existing recirculating tank complete and ready for operation.

4. **Sewage Pump Controls** includes installation of the control panel, steel support posts, conduit, wiring, alarms and lights, sensors, circuit breakers, relays, runtime meter, magnetic starter, electrical connections, manuals and system training and all other related work and materials required for operation of the pump system.

5. **Excavation, Earth, Spec** includes removing portions of the existing clay liner, as shown on the plans or as approved by the Engineer, including removal of any existing vegetation and any necessary repairs to or regrading of existing clay liner.

6. **Embankment, Spec, (CIP)** includes backfill of the recirculating sand filter and to repair damage to existing lagoon berms as necessary. Ensure berms are repaired by depositing suitable fill material in 6-inch layers loose measure and compacting each layer to not less than 95 percent of the maximum unit weight.