SECTION 22134

FACILITY PACKAGED DUPLEX GRINDER SEWAGE PUMPING STATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This Section includes wet-well, packaged pumping stations with submersible grinder sewage pumps.

B. The contractor shall provide labor, materials, equipment and incidentals required to provide one (1) Duplex 2HP Grinder Pump Package, consisting of two (2) centrifugal grinder pumps as specified herein. The pump models shall be LSG Series three phase grinder pumps as per Omnivore D3672LSG as manufactured by Liberty Pumps or approved similar.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 PERFORMANCE REQUIREMENTS

A. Pressure Rating of Sewage Pumps and Discharge Piping Components: At least equal to sewage pump discharge pressure, but not less than 125 psig.

B. Pressure Rating of Other Piping Components: At least equal to system operating pressure.

1.4 SUBMITTALS

A. Product Data: Contractor shall provide manufacturer’s information for all equipment and components to be provided. Product information shall include catalog cut sheets, manufacturer’s standard drawings, anchoring information, and other literature and shall provide sufficient information to fully describe the proposed equipment and confirm conformity to the project documents. Product information shall show principal dimensions, size, type, and locations of all connections and fittings and locations of all options/accessories. Include rated capacities, operating characteristics, furnished specialties, and accessories. Provide manufacturer’s written delivery, storage and handling requirements and installation procedures.

B. Shop Drawings: Contractor shall provide shop drawings showing equipment, components layout, connections & fittings, etc. Shop drawings shall be site specific and provide sufficient information to fully describe the proposed locations, elevations and layout of the system. Show fabrication and installation details for each packaged sewage pumping station. Detail equipment assemblies and indicate dimensions; shipping, installed, and operating weights; loads; required clearances; method of field assembly; components; electrical characteristics; and location and size of each field connection.

C. Wiring Diagrams: Contractor shall provide wiring diagrams including but not limited to power, signal, and control wiring.

D. Submit copies of all quality control testing documentation and installation inspection documentation including but not limited to:

1. Source quality-control test reports
2. Field quality-control test reports

E. Operation and Maintenance Data: Submit manufacturer's O&M information including maintenance requirements, spare parts, specialty tools (if any), etc. O&M submission shall include site specific drawings of entire system including all equipment, locations, elevations, electrical information, etc.

F. Warranty: Submit manufacturer's standard warranty information for all equipment, components and appurtenances.

G. Product Certificates: For each type of sewage pump, signed by product manufacturer.

H. Qualification Data: For Installer.

1.5 QUALITY ASSURANCE

A. Fabricate, deliver, assemble and install all equipment under this specification in full conformity with the specifications, all local, state, and federal laws/standards, as shown on the Contract Drawings and approved shop drawings.

B. Manufacturer shall have a minimum of 5 years experience in producing similar equipment and shall show evidence of at least 10 installations in satisfactory operation.

C. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

D. Comply with HI 1.1-1.2, "Centrifugal Pumps for Nomenclature and Definitions"; HI 1.3, "Centrifugal Pumps for Design and Application"; and HI 1.4, "Centrifugal Pumps for Installation, Operation and Maintenance," for sewage pumps.

E. Comply with UL 778, "Motor-Operated Water Pumps," for sewage pumps.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store equipment components in accordance with approved shop drawings, manufacturer's written instructions and as specified.

B. Use every precaution to prevent damage to the equipment during transport and delivery to the site.
1. Do not allow equipment to be dropped, bumped, dragged, pushed, rolled, or moved in any way which will cause damage.

2. If, in the process of transportation or handling, any equipment is damaged, replace or repair such equipment or accessories. Make all required repairs. Repairs shall be subject to the approval of the Engineer.

C. Materials may be stored outdoors on pallets, or other wooden structures providing for proper support and drainage.

D. On-site storage location shall be coordinated with the Owner and all trades prior to delivery of materials.

E. Damage to materials during storage shall be prevented primarily by minimizing the amount of time they are stored at the jobsite before being incorporated into the work.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Sewer Service: Do not interrupt sanitary sewer service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sanitary sewer service according to requirements indicated:

1. Notify Engineer and Owner no fewer than two days in advance of proposed interruption of sanitary sewer service.
2. Do not proceed with interruption of sanitary sewer service without Engineer or Owner's written permission.

1.8 COORDINATION

A. Coordinate location and elevation of equipment to actual field conditions and final selection of equipment.

B. Contractor shall be responsible to coordinate the work with all other trades.

C. Works hall be scheduled to not interfere with Owner’s on-site operations.

D. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged sewage pumping stations that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures including shell.
   b. Faulty operation of sewage pumps, controls, or accessories.
   c. Deterioration of metals, metal finishes, and other materials beyond normal use.
2. Warranty Period for Shell: 3 years from date of Substantial Completion.

3. Warranty Period for Sewage Pumps and Controls: 3 years from date of Substantial Completion.
4. Warranty Period for Accessories: 3 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WET-WELL, PACKAGED SEWAGE GRINDER PUMPING STATIONS

A. Wet-Well, Packaged Sewage Pumping Station with Submersible Grinder Sewage Pumps:

1. Description: Factory fabricated, assembled, and tested with wet well for sewage pumps and collection of sanitary sewage and with dry equipment chamber for controls and accessories.

    a. Orientation: Shell underground with dry equipment chamber underground with top flush with grade.
    b. Shell: Factory fabricated from fiberglass.
    c. Sewage Pumps: Duplex submersible grinder-type sewage pumps, with guide rail, quick-disconnect system, controls, and piping. Include stainless-steel grinder impeller and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable.

2. Capacities and Characteristics:

    a. Diameter or Dimensions of Shell: 36.5 inches.
    b. Height of Shell Base Section: 72 inches.
    c. Pumping Station, Inlet Pipe Size: 4-inches with flange gasket and pipe seal**.**
    d. Pumping Station, Discharge Pipe Size: 2” SDR-9 HDPE.
    e. Sewage Pumps: Two required.
    f. Each Sump Pump:

        1) Capacity: 38 gpm.
        2) Total Dynamic Head: 55.70 feet.
        3) Speed: 3450 rpm
        4) Impeller: Grinder type.
        5) Inlet Size: 4” With flange gasket and pipe seal.
        6) Discharge Size: 2” SDR-9 HDPE.
        7) Motor Size: 2 hp.
        8) Electrical Characteristics:

            a) Volts: 240 V.
            b) Phases: Three
            c) Hertz: 60.

    g. Characteristics:

1) Full-Load Amperes: 10.6**.**
2) Minimum Circuit Ampacity: 30 Amp
3) Maximum Overcurrent Protection: 30 Amp

2.2 CONTROLS

A. Control Sequence of Operation: Cycle each sewage pump on and off automatically to maintain wet-well sewage level. Automatic control operates both pumps in parallel if wet-well level rises above starting point of low-level pump, until shutoff level is reached. Automatic alternator, with manual disconnect switch, changes sequence of lead-lag sewage pumps at completion of each pumping cycle.

B. Transducer System: Senses variations of sewage level in wet well. Include high and low adjustments capable of operating on 6-inch minimum differential of liquid level.

C. Motor Controllers: Magnetic, full voltage, non-reversing. Include undervoltage release, thermal-overload heaters in each phase, manual reset buttons, and hand-automatic selector switches. Include circuit breakers to provide branch-circuit protection for each controller.

D. 120-V accessory controls with 15-A, single-phase circuit breakers or fuses for each item.

E. Control Panel: NEMA 4X weatherproof enclosure for indoor/outdoor mounting with audible 80 DBI and visual high-water alarm, complying with UL 508A with separate compartments and covers for controllers, circuit breakers, transformers, alternators, and single-phase controls. Include 20-A duplex receptacle in NEMA WD 1, Configuration 5-20R mounted on exterior of control panel.

1. Mounting: At locations shown on Contract Drawings
2. Enclosure: NEMA 4X

F. Install labels on panel face to identify switches and controls.

G. Connection for Portable Generator: Nonautomatic (manual) transfer switch with receptacle matching generator electrical power requirements.

2.3 ACCESSORIES

A. Ventilation system is designed to be vented from the 4-inch diameter inlet pipe through a Garage Building Vent Stack.

B. High-Water Audio Alarm: Horn for audio indication of station high-water level, energized by Remote Alarm Circuit: Include contacts for connection to remote alarm panel.

2.4 MOTORS

A. Motors shall be oil filled and class B insulated NEMA B design, rated for continuous duty.

2.5 MISCELLANEOUS MATERIALS

A. Grout: ASTM C 1107, Grade B, non-shrink cement grout.

1. Design Mix: 4000-psi 28-day compressive strength.

B. Concrete: Concrete is specified in Section 033053 "Miscellaneous Cast-in-Place Concrete."

2.6 PACKAGED SEWAGE PUMPING STATION FABRICATION

A. Fabricate shell from fiberglass with structural-steel reinforcement.

1. Attach structural-steel reinforcement to top and bottom heads.
2. Fabricate shell with continuous joints to make watertight and gastight construction.
3. Attach air vent to pump chamber.

B. Entrance tube may be furnished separately for field installation.

C. Entrance Cover: Waterproof and corrosion resistant, with lock. Include way to open cover from inside tube if cover is locked.

D. Air Vent: Duct fabricated from corrosion-resistant material, extended to above grade, outlet turned down, and with insect screen in outlet.

E. Valves:

1. Sewage Pump Piping: Include gate valve on each pump inlet and gate and check valves on each discharge pipe.

F. Wiring: Tin-coated copper.

2.7 SOURCE QUALITY CONTROL

A. Test and inspect sewage pumps according to HI 1.6, "Centrifugal Pump Tests." Include test recordings that substantiate correct performance of pumps at design head, capacity, speed, and horsepower.

B. Test accessories and controls through complete cycle. Include test recordings that substantiate correct performance.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in of sewerage piping systems to verify actual locations of piping connections before packaged sewage pumping station installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Excavation."

3.3 INSTALLATION

A. Install packaged sewage pumping station components where indicated, according to specific equipment and piping arrangement indicated.

B. All equipment shall be installed in strict accordance with the most recent manufacturer's guidelines, NFPA, International Building Code, National Standard Plumbing Code, National Electrical Code, International Mechanical Code, Fuel Gas Subcode, local ordinance, recognized engineering procedures, and all other applicable codes.

C. Contractor shall coordinate the installation requirements of all equipment prior to shop drawing preparation to ensure all proper options, accessories, wiring, etc. are provided.

3.4 CONNECTIONS

A. Sanitary sewer piping installation requirements are specified in Section 02627 "HDPE Pipe and Fittings." Drawings indicate general arrangement of piping.

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

3.5 IDENTIFICATION

A. Install identifying labels permanently attached to equipment.

B. Install operating instruction signs permanently attached to equipment or on pumping station wall near control equipment.

C. Arrange for installing green warning tape over outside edges of underground packaged sewage pumping stations. Tape materials and their installation are specified in Section 31200 "Excavation and Backfill."

3.6 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing packaged sewage pumping stations and after electrical circuitry has been energized, test for compliance with requirements. Furnish water required for pump tests.

2. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Remove and replace packaged sewage pumping stations that do not pass tests and inspections and retest as specified above.

3.7 STARTUP SERVICE

1. Complete installation and startup check according to manufacturer's written instructions.
2. Adjust pump, accessory, and control settings, and safety and alarm devices.

3.8 PAYMENT

A. QUANTITIES AND PAYMENT

Payment for the packaged sewage pump station systems and all related items listed in this specification shall be made under the LUMP SUM bid item “SANITARY SERVICE”. Price shall include all labor, materials, freight, and equipment including but not limited to excavation, shoring/bracing/timbering, hold down slab, setting, pipe connections, backfill and all else necessary therefore and all other work in connection there with and incidental thereto.

END OF SECTION 22134